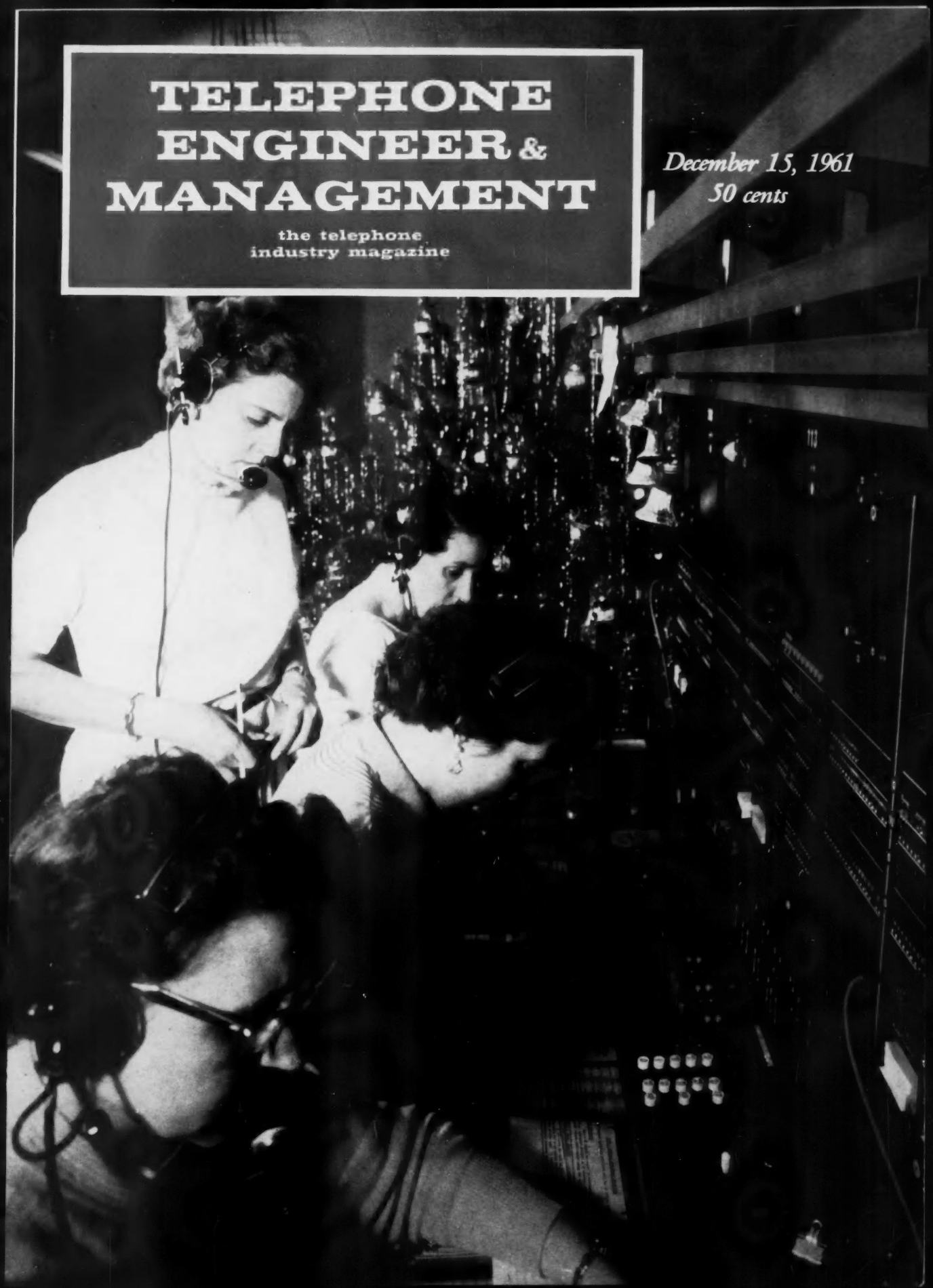
TELEPHONE ENGINEER & MANAGEMENT

the telephone industry magazine

December 15, 1961
50 cents



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2 SELL THE INTERVIEW!
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Average Total Qualified Circulation for 12-month period ending June, 1961 14,024

The Telephone Industry Magazine

Published on the 1st and 15th of each month by

Telephone Engineer Publishing Corp., 7720 Sheridan Rd., Chicago 26, Ill.
Telephone: Chicago, RO 4-3040 Area Code 312.

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THE TE&M FRONT COVER: — On Christmas Eve and Christmas Day, this long distance switchboard lights up like the nearby tree in a Southwestern Bell Tel. Co. central office. Bringing loved ones together during the holidays, operators find messages in the Atomic Age are very similar to those of 1961 years ago: "It's just a little place, operator. I don't know the number. Yes, I'll talk to either Mary or Joseph." . . . "We'll start tomorrow. We've gifts from the East. Yes, presents for you and the child." . . . "Operator, they may be out on the south forty with their sheep, but they'll want to hear the good news . . . A baby boy. Yes, we have a son."

TELEPHONE ENGINEER & MANAGEMENT is published on the 1st and 15th of each month by TELEPHONE ENGINEER PUBLISHING CORP., 7720 Sheridan Rd., Chicago 26, Ill. Office of Publication, 600 S. 7th St., Rochelle, Ill. Second Class Postage paid at Rochelle, Ill.

Subscriptions: U.S.A. and possessions, $4.00 per year; Canada $5.00; in all other countries $6.50. Single copies. U.S.A. 50 cents.

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BATTERY CHARGERS

SMALLER AND LIGHTER: Twice the power in half the space . . . lighter weight, too.

STABILITY OF OPERATION: DC output voltage stabilized to ±1%. Complete overload and short circuit protection.

SYSTEMIZED MODULAR DESIGN: The S-series has been designed with the system in mind. As requirements increase, you can add larger ratings in the same space. A full line of accessories is available from stock.

SALES-SERVICE: A nationwide network of Raytheon field sales/service offices is on 24-hour call. Parts and replacement units are available in the field.

For more information on Raytheon's S-series silicon battery chargers, call or write your nearest Raytheon sales office or Raytheon Company, Keeler Avenue, South Norwalk, Conn. Telephone VOlunteer 6-5571. For a complete description of S-series telephone power equipment send for new condensed catalog and selector chart 4-300.

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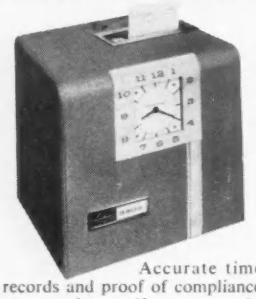
Keep those wage hour records on a *Lathem* TIME RECORDER



Accurate time records and proof of compliance are *mandatory*, if you are subject to the Wage Hour Law.

For years, Lathem Time Recorders have been simplifying wage-hour timekeeping for business. Many companies have avoided stiff fines by having time cards to prove compliance.

And, here's another fact, the new revisions in the wage-hour law may mean increases in your salaries and wages. If so, it will be more important than ever to eliminate tardiness with a Lathem Time Recorder.

There is a Lathem to fit your size business – priced to fit your business budget, and capable of paying for itself in a matter of months.

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WITHOUT OBLIGATION Send catalogs and prices on Lathem Recorders, together with proper time cards for keeping wage-hour records.

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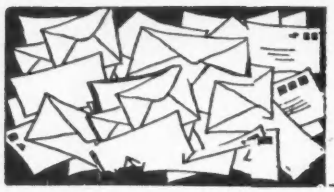

LETTERS to the editor

They're on the Way

To The Editor: — Please send me 12 reprints of the article, "Temporary Grounding," by E. W. Glancy which appeared in the September 15 issue of the TE&M.

J. L. Poe,
Safety Supervisor,
Northwestern Bell Tel. Co.
Sioux Falls, S. D.

Flowers to Stacey

To The Editor: — Our service representatives read with great interest Mr. Stacey's recent article on commercial activities in the Hawaiian Islands. He was extremely complimentary, and all of us are proud to know that we left this wonderful impression with him.

This article was circulated to all of our service representatives, and each one of them signed a card which was sent to Mr. Stacey with a bouquet of anthuriums as a "thank you" and "much aloha" from "the most beautiful service representatives in the world."

Gordon Lawson,
District Commercial Manager,
Hawaiian Telephone Co.,
Honolulu, Hawaii.

Glad to Send Them

To The Editor: — Will you please advise us how we can obtain 10 copies of the article on "Buried Cable Construction and Maintenance Problems" published in issue of *Telephone Engineer and Management* dated October 15, 1961, and the price of same.

H. C. Kingsbury,
Outside Plant Engineer
Maritime Tel. & Tel. Co.
Halifax, Nova Scotia.

Need Help? ? Who doesn't? ? Well, before the solution to a tough operating problem, or the answer to a question, has you talking to yourself, send the troublemaker to TE&M. We'll do our best to come up with the right answer.

Helpful Circuit

To The Editor: — You may be interested to know that the circuit diagram Mr. Ehinger kindly sent me some time ago has been put to work and is now functioning very well. It connects a radiotelephone transmitter and receiver to a PBX.

A jack was obtained from the local telephone company that has an extra pair of contacts which "make" when the plug is inserted. These contacts are used to key the transmitter. The receiver has a carrier-operated relay which closes the circuit to the hybrid and lights the associated PBX bulb when a signal is being received. The relay contacts are shunted with a 1-mfd. capacitor.

Once again, I'd like to express appreciation for Mr. Ehinger's help.

Philip B. Smith,
San Jose,
Costa Rica.

Likes Kirby's Article

To The Editor: — We would like your permission to reprint for internal use the article in your October 15 issue by Mr. Kirby entitled "CDO Plant Maintenance." Plans are, if you agree, to distribute the article to about 100 of our Missouri plant men who are concerned with CDO maintenance.

Gene Shnell,
for General Plant Manager,
W. H. Neukomm,
Southwestern Bell Tel. Co.
St. Louis, Mo.

Telephone Diplomat

To The Editor: — Would you please send me a copy of "Be a Telephone Diplomat?" We feel that it would be of much assistance to us in our own Good Usage Program. Thank you very much.

Mary A. McDevitt,
PBX Instructor,
Southern Bell Tel. & Tel. Co.,
Louisville, Ky.

USITA
reflects continuous aim of Independents to improve service

No group organization is more deservedly credited with a job well done than the USITA. By the same token, no membership is more closely identified with the aims of its organization. Indeed, the sustained and constructive program of the USITA is a tribute to the vision and vigilance of Independent telephone companies in continually bettering the service they make available to their subscribers.

This is not to be construed as a product endorsement by United States Independent Telephone Association.

Less than a hundred years ago, Scottsbluff was pioneer country, its hills echoing to the wagon master's cry of "Wagons Ho!" Today this area of the North Platte valley and adjoining Western Nebraska and Eastern Wyoming is a thriving center of farms, cattle, oil and industry. The United Telephone Company of the West serves this region with upwards of 20,000 telephones, all dial operated. Like other progressive Independents all over the nation, United chooses Sherron steel booths for its lucrative pay-station locations. The above photo depicts a typical Sherron installation by United.

as evidenced by UNITED TELEPHONE COMPANY OF THE WEST
(SCOTTSBLUFF, NEBRASKA)

SEE OUR CATALOG IN SWEET'S — INDEPENDENT — Sherron ACOUSTIC SEE-THRU STEEL-STAINLESS STEEL OUTDOOR AND INDOOR TELEPHONE BOOTHS

There's a Sherron booth for every location and budget in "gold," stainless steel or cold rolled steel.

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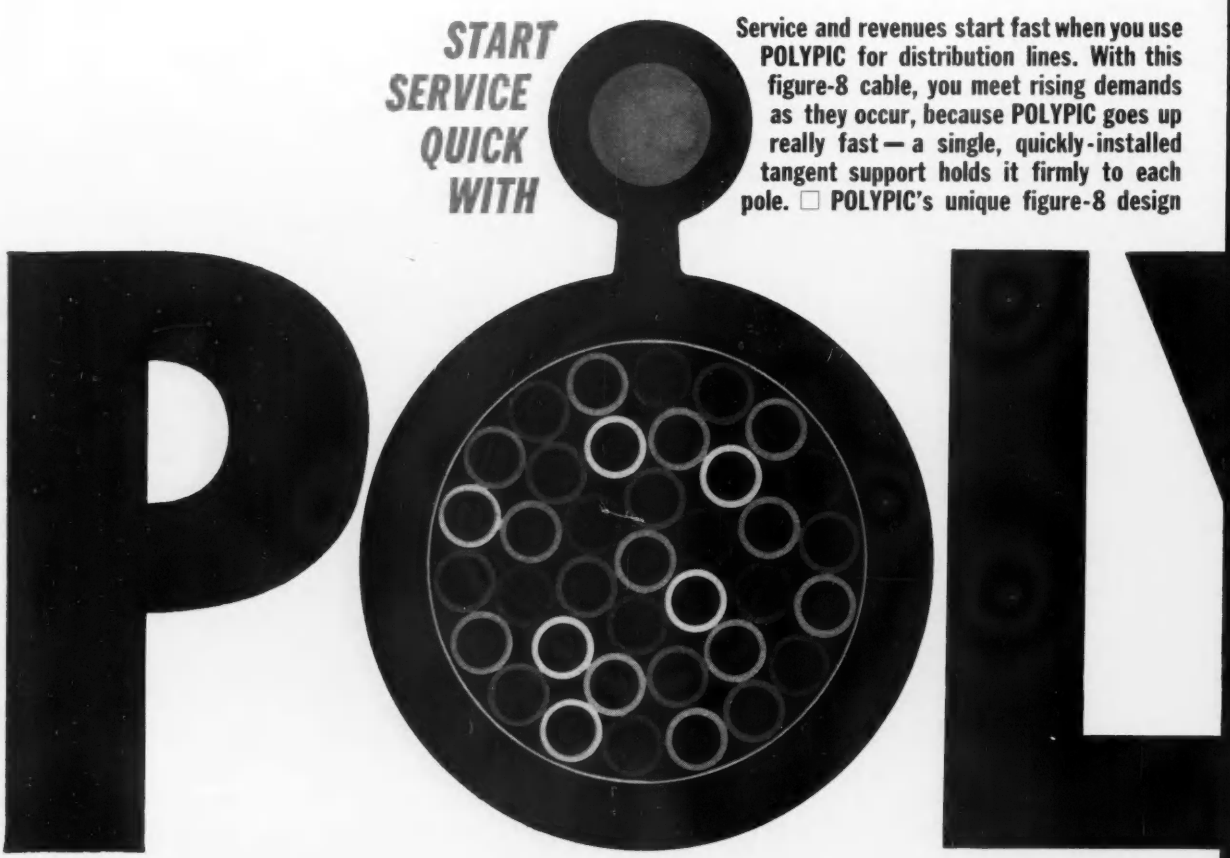
START SERVICE QUICK WITH

Service and revenues start fast when you use POLYPIC for distribution lines. With this figure-8 cable, you meet rising demands as they occur, because POLYPIC goes up really fast — a single, quickly-installed tangent support holds it firmly to each pole. □ POLYPIC's unique figure-8 design



improves transmission over former RD cable because of lower variations of mutual capacitance between wet and dry conditions. And its high molecular weight polyethylene jacket, over both messenger and cable, gives excellent mechanical protection and long service life. □ Get details on POLYPIC from your distributor, or write General Cable Corp., 730 Third Avenue, New York 17, New York □ Distributed by: Automatic Electric Sales Corporation, Northlake, Illinois; Leich Sales Corporation, 427 West Randolph Street, Chicago 6, Illinois

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GENERAL CABLE CORPORATION

YPIC

what's new at SUTTLE

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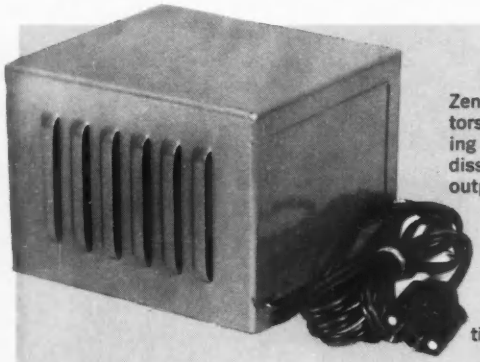
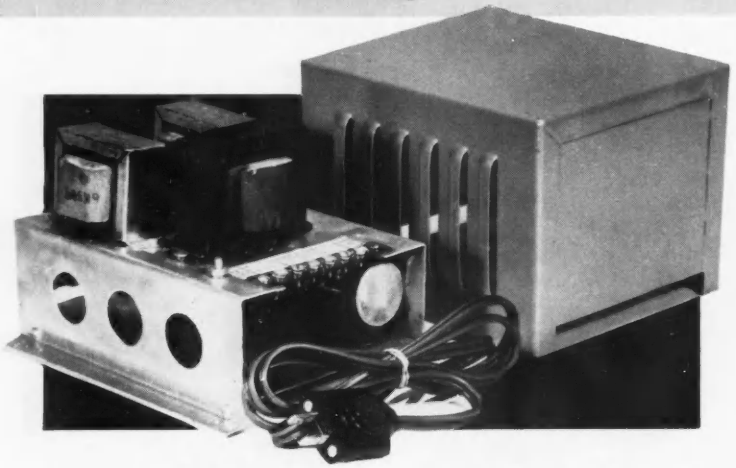


A.C.-D.C. OR D.C. ONLY POWER SUPPLIES

Zener diodes, electrolytic capacitors, fully fused circuits providing no more than 4 watts heat dissipation (SE-100X), and ±5% output regulation . . . 48 V.D.C. talking supply (only 5 mv. ripple!) A.C. or DC. signal output operates buzzers, bells, push-buttons, relays, lamps, chimes, other wiring plans and telecommunications devices as desired.



A versatile new signal and talk battery power source series at low costs never before offered the communications industry! Used with Suttlecom SE-5080A, 6080A, and 7080A switching keys (new Suttle small business trunking and intercom system) or for many other telephone and communications system requirements. These low cost, small power packages are housed in attractive vented, louvred cases only 6" x 7" x 5" high, easily wall mounted. Weight 9 lbs. — for continuous duty.

MODELS AVAILABLE ARE:

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SE-100X	$50.00	6v., 12v., 24v.	2.0	48v.	.25	48v.	.25
SE-150X	55.00	6v., 12v., 24v.	2.0	48v.	.5	48v.	.5
SE-200X	47.00	——	—	48v.	.25	48v.	.25
SE-250X	49.00	——	—	48v.	.5	48v.	.5
SE-300X	49.00	——	—	30v.	.5	30v.	.5

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coming CONVENTIONS

NATIONAL Tel. Coop. Assoc., Jung Hotel, New Orleans, La., Jan. 15-17, 1962.

MINNESOTA Tel. Assoc.,Radisson Hotel, Minn., Minn., Feb. 25-28, 1962.

LOUISIANA Tel. Assoc., Monteleone Hotel, New Orleans, La., Feb. 28-Mar. 1, 1962.

KENTUCKY Tel. Assoc., Phoenix Hotel, Lexington, Ky., Mar. 6, 1962.

TEXAS Telephone Assoc., Sheraton-Dallas Hotel, Dallas, Tex., Mar. 11-13, 1962.

IOWA Tel. Assoc., Roosevelt Hotel, Cedar Rapids, Ia., Mar. 19-20., 1962.

OHIO Tel. Assoc., Deshler Hilton Hotel, Columbus, Ohio, Apr. 3-4, 1962.

NEBRASKA Tel. Assoc., Sheraton-Fontenelle Hotel, Omaha, Nebr., Apr. 18-19, 1962.

WISCONSIN Tel. Assoc., Plankinton Hotel, Milwaukee, Wis., May 8-9, 1962.

INDIANA Tel. Assoc., Claypool Hotel, Indianapolis, Ind., May 9-10, 1962.

MISSOURI-KANSAS Tel. Assoc., Town House Hotel, Kansas City, Kan., May 21-22, 1962.

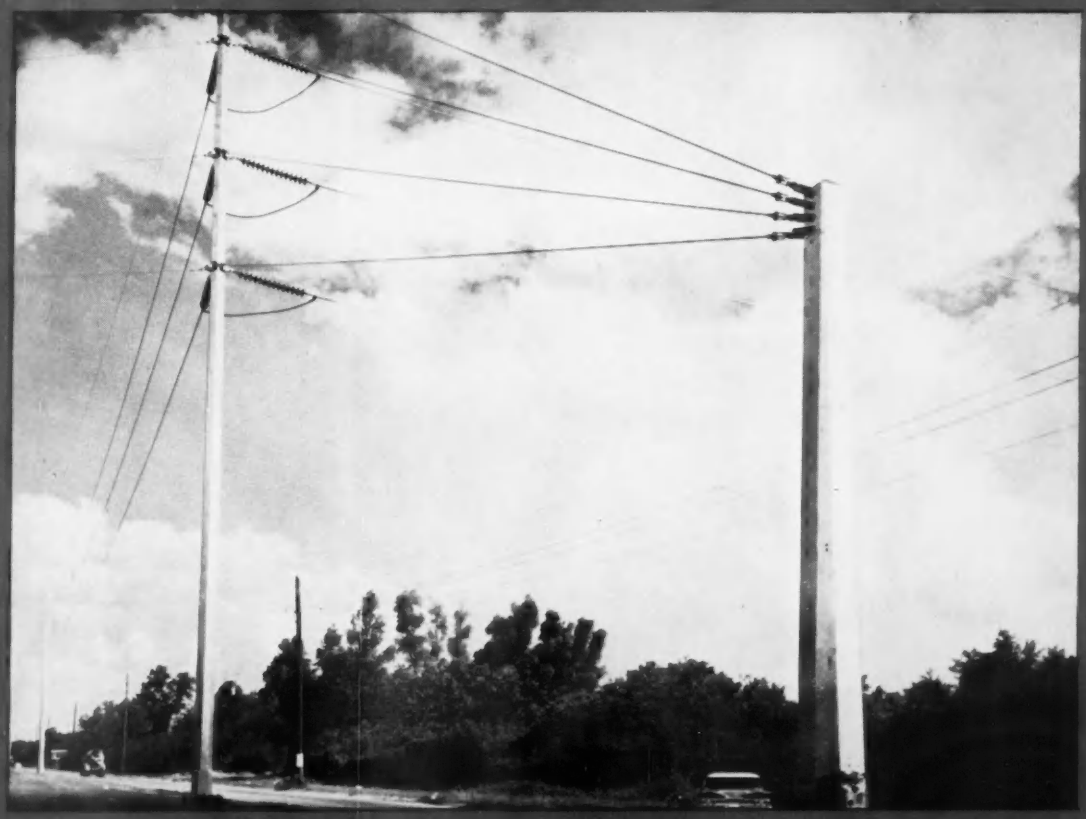
ILLINOIS Tel. Assoc., Abraham Lincoln Hotel, Springfield, Ill., May 24-25, 1962.

PENNSYLVANIA Tel. Assoc., Bedford Springs Hotel, Bedford, Pa., June 4-6, 1962.

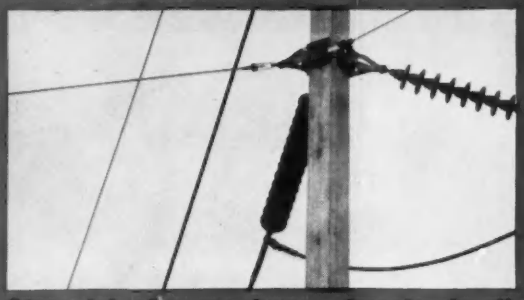
NEW YORK Tel. Assoc., White Face Inn on Lake Placid, Whiteface, N. Y., June 11-13, 1962.

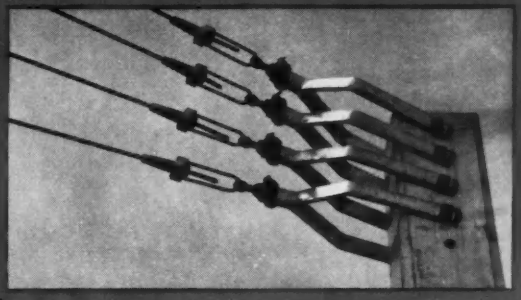
CALIFORNIA Tel. Assoc., Jack Tar Hotel, San Francisco, June 13-14, 1962.

WASHINGTON-OREGON Tel. Assoc., Sheraton Hotel, Portland, Oregon, June 21-22, 1962.



This new 115 KV distribution line was designed to withstand hurricane force





Strandvise® was chosen for deadending because...

But let us brief you first: When the Louisiana Power & Light Company had to plan an aesthetically agreeable aerial primary or "go underground", the result was this 115 KV distribution line along General De Gaulle Drive in New Orleans, La. Specifications were for 1468 MCM ACSR, 7/16" EHS galvanized strand, 85' octagonal aluminum poles . . . and Strandvise. The straps tying Strandvise to the poles were especially designed for use with Strandvise. "Convenience of application, ease of installation and appearance" were the reasons given for specifying Strandvise.

When progressive planning becomes reality in the Power and Telephone Industries, chances are that one or more of Reliable's products will be there.

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A Symbol of Integrity Since 1909

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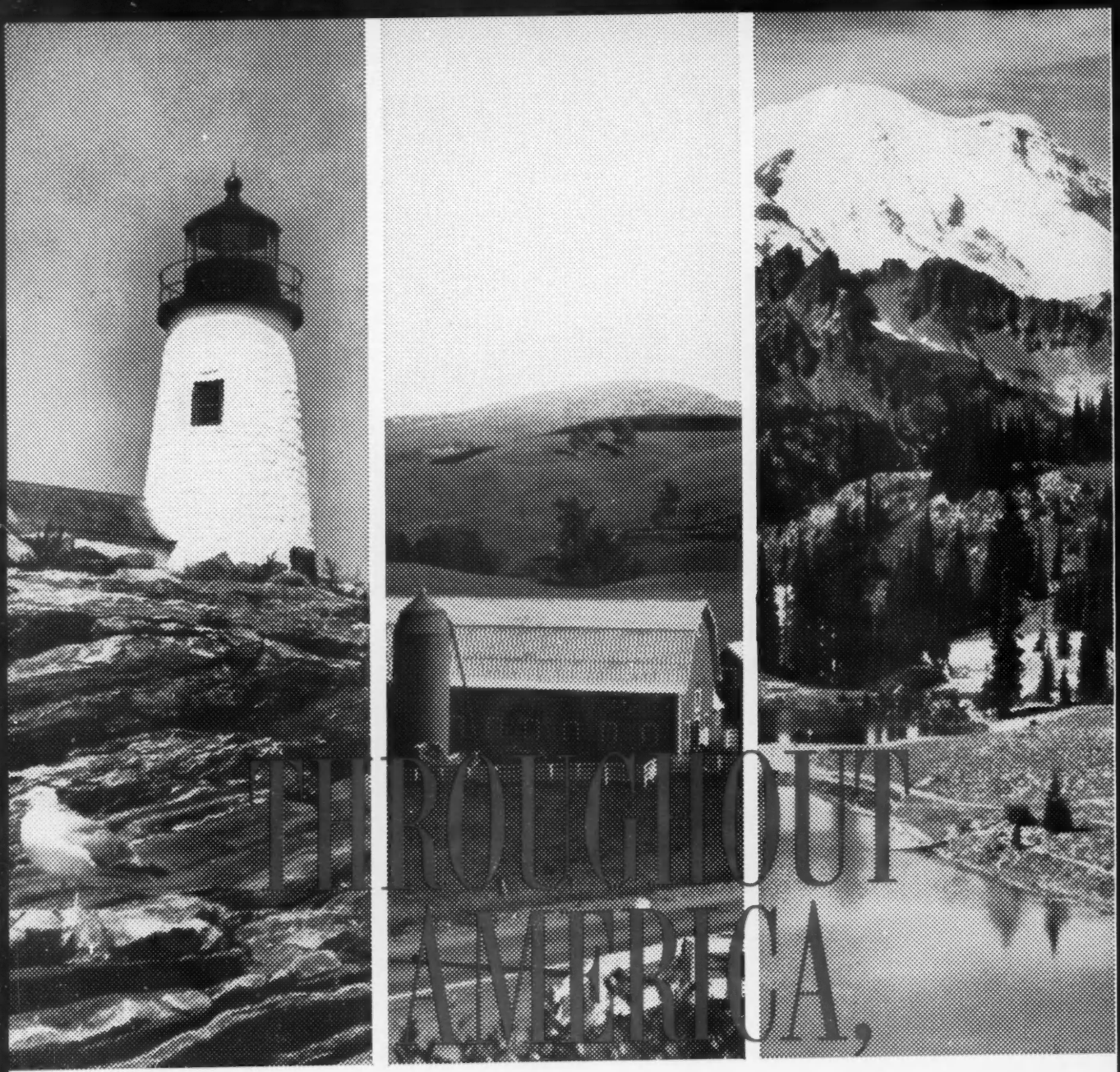
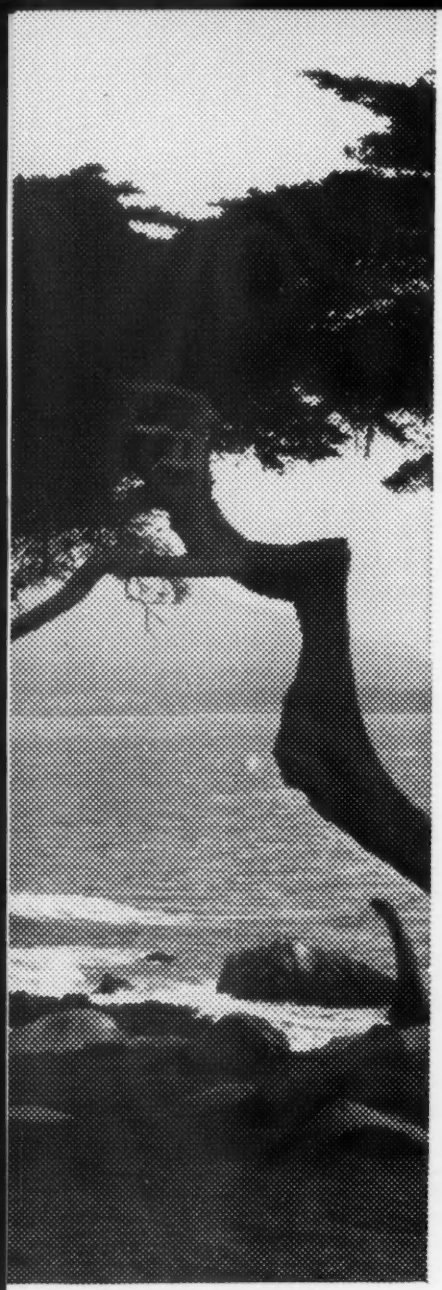


THROUGHOUT AMERICA,

ONE TELEPHONE STANDS OUT



The K-500 – tested and requested by more independents than *any* other subscriber unit. The standard setter of the industry, in both design and performance.

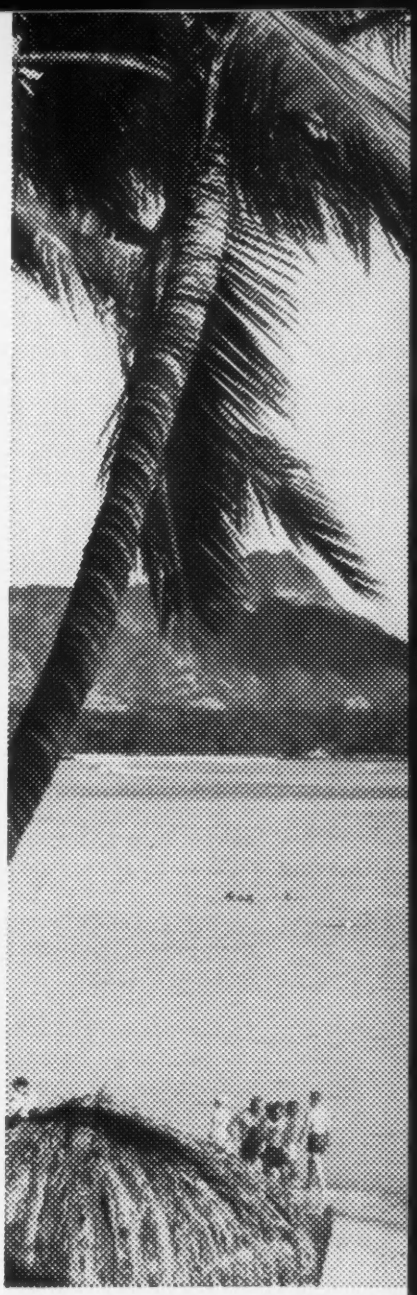
Call ITT Kellogg–your source for the famous K-500 instrument, in both table and wall models, in black, white and nine attractive colors.

Another ITT Kellogg Exclusive!

3 complete Sell-A-Phone promotions . . .

help sell *more home subscriber services!*

Choose the promotion, or promotions, that best suit your company. Get everything you need to promote extension phones, color and other revenue-building "deluxe" home services.



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NEWSLETTER
TELEPHONE INDUSTRY

Prepared By The Editorial Staff of TELEPHONE ENGINEER and MANAGEMENT

ON THE 1st OF EACH MONTH ★ ON THE 15th OF EACH MONTH

Dear Sir: December 15, 1961

ELECTRONIC PRODUCT EXPORTS FROM U.S. UP 33% IN FIRST NINE MONTHS . . . Electronic products exported from United States in first nine months of 1961 were valued at $437,400,000, or 33 per cent higher than for the same period of 1960, the Business & Defense Services Administration's Electronics Division has reported. The advance reflected increased sales of electronic computers and test equipment to Japan and Western Europe, and substantial gains in exports of electronic components.

HAGGERTY, PRESIDENT OF TEXAS INSTRUMENTS, TO HEAD IRE IN COMING YEAR . . . Election of Patrick E. Haggerty, pres. of Texas Instruments, Inc., as pres. for 1962 of the Institute of Radio Engineers, to succeed Lloyd V. Berkner, was announced last month.

Among others whose elections were formally announced were two vice presidents: Andre M. Angot, technical director of Telecommunications Radioelectriques et Telephoniques, Paris, France, and T. A. Hunter, president of Hunter Manufacturing Co. and research professor at Iowa State University.

Seventy-eight leading radio engineers and scientists from the U. S. and other countries were named Fellows by the IRE Board of Directors at a November meeting in New York City.

Those named include: Benjamin Adler, Adler Electronics; H. G. Baerwald, Sandia Corp.; R. S. Caruthers, International Telephone & Telegraph Corp.; E. W. Chapin, Laboratory Division, Federal Communications Commission; A. R. D'Heedene, J. G. Kreer, E. L. Norton, and David Slepian of Bell Telephone Laboratories, and Dr. Brockway McMillan, formerly with the Laboratories but now with the US Air Force as assistant secretary for research and development; W. J. Pietenpol, Sylvania Electric Products; R. W. Sonnefeldt, RCA Industrial Computer System; Victor Twersky, Sylvania Electronic Defense Laboratories; and H. J. Woll, RCA Defense Electronics Products.

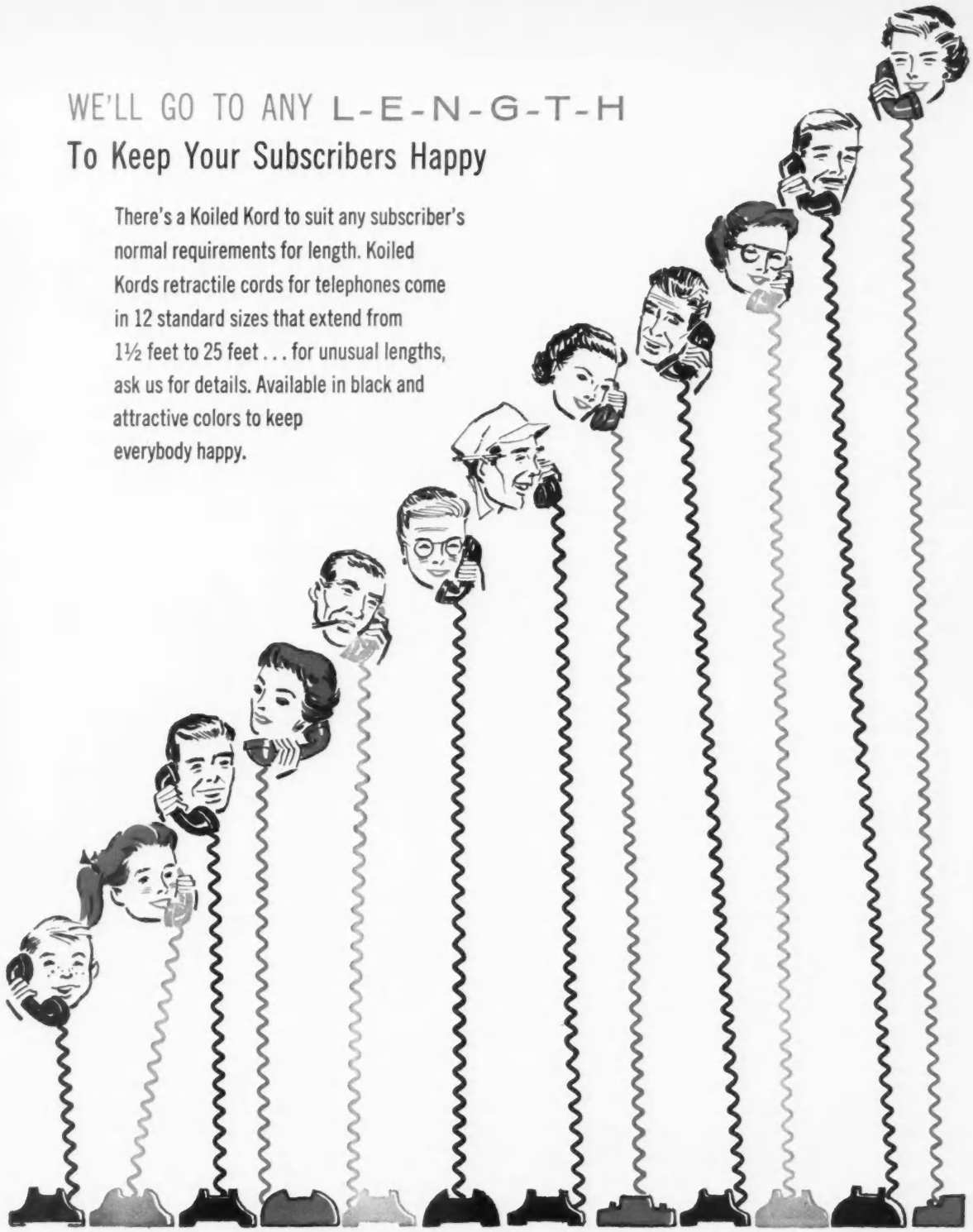
ACQUISITIONS & MERGERS . . . Illinois Commerce Commission authorized County Tel. Co., a newly-organized corporation, to purchase Ingraham Tel. Co., Passport Tel. Co., & Wakefield-Mendelin Tel. Co., and operate a telephone utility in and around the villages of Ingraham, Passport, Wakefield and Mendelin. County Tel. Co. will construct dial exchange at Mendelin to serve the area . . . Bison State Tel. Co., Inc., has purchased Avon (S. D.) Tel. Co. from Orvall Elliott. Avon exchange will be converted to dial . . . Wisconsin Tel. Co. purchased Kaukauna (Wis.) Tel. Co. Kaukauna Tel. was incorporated in 1909. It services about 620 customers. Purchase price was $101,320 . . . Pineland Tel. Co., McGregor, Minn., purchased Bain Tel. Assoc., Palisade, Minn. . . . Clifford C. Pearce and his son Donald, Riceville, Iowa, purchased Alden Iowa Tel. Co. . . . New York Public Service Commission authorized Dundee (N. Y.) Tel. & Tel. Co., to sell its plant and system to Western Counties Tel. Corp. for a base price of about $310,800. Dundee Tel. & Tel. was incorporated in 1903. It serves about 1,600 stations.

NEW UTILITIES' SIGNAL DEVICE USES NORMAL PHONE WIRES, CENTRAL OFFICE . . . A new signaling device, "which for the first time transmits audible coded signals from

WE'LL GO TO ANY L-E-N-G-T-H

To Keep Your Subscribers Happy

There's a Koiled Kord to suit any subscriber's normal requirements for length. Koiled Kords retractile cords for telephones come in 12 standard sizes that extend from 1½ feet to 25 feet . . . for unusual lengths, ask us for details. Available in black and attractive colors to keep everybody happy.



Koiled Kords INC.

A Subsidiary of Whitney Blake Company

New Haven 14, Connecticut

Telephone: CHestnut 8-5515 . . . TWX NH84

(Concluded from page 12)

remote locations over a nearby existing telephone installation," was described at a meeting of the Electric Council of New England in Dedham, Mass., last month by Raymond P. Cormier, substation planning engineer for the Connecticut Light & Power Co.

Cormier explained how the telephone signal coding device is being used by his company to monitor the operating condition of electrical equipment at unattended utility substations. In operation, the remote substation, which is equipped with a conventional telephone, is dialed from any standard telephone at any convenient location.

At the receiving end, a special relay causes the new signaling device to become activated and connect the telephone hand set to the line, with the signaling unit, in turn, monitoring the electrical equipment at the substation and transmitting predetermined codes via audible signals which are heard by the person calling. It makes use of regular telephone company wires and regular central office equipment.

AT&T CONSTRUCTION APPLICATION FOR DIAL TWX FACILITIES APPROVED . . . Construction application filed by the American Tel. & Tel. Co. Long Lines Department and six Bell System associated companies last summer covering facilities to be added to the direct distance dialing network to care for requirements resulting from the planned conversion of the teletypewriter exchange service network to dial operation in 1962 has been granted by FCC Telephone Committee.

Application covered facilities to provide about 1,000,000 telephone channel miles. Long Lines explained in the filing that it will be necessary to increase the number of Long Lines telephone circuits by about 4,400 to handle the switched teletypewriter traffic on a dial basis. It was also noted that band shifters, which will produce six TWX channels from each voice grade channel, will be used where economical.

MISSOURI AND TEXAS INDEPENDENT COMPANIES AND CWA REPORT AGREEMENTS . . . Capital City Tel. Co., Jefferson City, Mo., and the Communications Workers of America have reached agreement on a one-year contract covering traffic employes that provides wage increases of 2½ to five cents an hour, some traffic split tour differentials of 25 cents an hour, and an increase in the Christmas Eve and New Year's Eve differentials from $2 to $3, including all-night tours.

Lufkin Telephone Exchange and Conroy Telephone Co., Lufkin, Tex., and CWA agreed, under a wage reopener at the end of the first year of a two-year contract, on increases of four to five cents an hour for traffic employes, six cents across-the-board for commercial, four to 14 cents for plant, and five cents across-the-board for house service. The traffic differential was increased five cents a tour, and the service assistant differential by one cent an hour.

WITH THE COMMISSIONS . . . In Vermont, John D. Paterson was recently appointed chairman of Public Service Board to fill vacancy created by appointment of former chairman Charles R. Ross to the Federal Power Commission . . . In Wisconsin, Henry J. O'Leary, chief of rates & research for the Public Service Commission for past 30 years, resigned from commission on November 1, and will be associated with the Madison Gas & Electric Co. . . . Federal Communications Commission Annual Report Forms "M" for telephone companies are now available from Superintendent of Documents, U. S. Government Printing Office, Washington 25, D.C., at $1.50 per copy.

Direct-buried, four-inch MARLEX conduit was used for primary circuits. Insert photo shows butt-fusion joining of conduit lengths prior to installation.

Over 93¢ per foot savings with MARLEX* conduit

Tough, lightweight, non-corroding conduit of MARLEX plastic proves economical...easy to install at shopping center in Casper, Wyoming.

At the new Sunrise Center, underground circuits for parking lot lighting, primary, and secondary distribution are carried in direct-buried MARLEX conduit varying in size from one to four inches. Mr. Emmett Ostlind (President of Ostlind Electric Company, the contractor on the job) is enthusiastic about the economy and ease of using MARLEX conduit. He reports: "In four-inch conduit we saved 93 cents per foot on material cost by using MARLEX instead of steel. MARLEX is also easier, faster and more economical to install . . . provides for easy cable pulling . . . and is completely compatible with standard conduit accessories and fixtures."

Rigid or flexible, large or small diameter—lightweight conduit made of MARLEX high density plastic is effortlessly handled without heavy equipment, economically shipped, and easily installed with butt-fusion joints, threaded or drive-on couplings. Ideal for both above-ground and direct-buried installations . . . MARLEX conduit resists acids, solvents, alkalies, bacteria, rot and corrosion . . . possesses excellent load bearing strength, high dielectric, and a wide usable temperature range. Its smooth inner surface also makes cable pulling easier and faster.

Conduit of MARLEX for this installation was supplied by Triangle Conduit and Cable Company, New Brunswick, New Jersey, through Graybar Electric Company, Denver, Colorado. Architect: Forrest Hamilton, Casper, Wyoming.

*MARLEX is a trademark for Phillips family of olefin polymers.

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PHILLIPS 66 MARLEX PLASTICS

Washington OBSERVATIONS

By ROLAND DAVIES, FRED HENCK and TOM MALIA

FCC, taking action immediately after completion of oral argument, denies Motorola petition for expedited "threshold" Telpak decision; case remanded to examiner conducting overall Telpak proceeding.

TAKING ACTION almost in minutes after it completed an oral argument on narrow issues relating to the American Telephone & Telegraph Co.'s Telpak tariff raised by Motorola, Inc., the Federal Communications Commission directed its staff to prepare an order denying the Motorola request for an expedited decision on the two issues brought up.

At the same time, the commission formally remanded the case to Examiner David I. Kraushaar, presiding in the FCC's over-all hearing and investigation into the Telpak hearing, which began December 11.

Other than the rapidity with which it was officially announced — about 1½ hours after the FCC completed the oral argument in the "threshold" case — the commission's ruling came as no surprise to those who attended the oral argument.

Comments and questions by most of the five FCC members who heard the oral argument indicated serious doubt in their minds that the commission would be in a position to take action on the tariff modifications under suspension until December 8 — even if it should have otherwise decided to do so — on the basis of the limited evidence offered at the evidentiary hearing of the case four days before.

Major questions presented by the FCC members during the session concerned: Whether they had heard sufficient evidence to decide if the Telpak service is or is not distinguishable from other private line services; whether the cost of providing a given number of channels is different depending on the number of customers who receive them — the two issues in the proceeding — and, as a corollary, whether they had any basis for ruling out the tariff when Telpak opponents presented no oral evidence at the session.

A full proceeding before the commission is needed before the basic Telpak issues can be disposed of, several user representatives participating in the argument emphasized. This point drew attention from several commission members.

Another major issue involved whether the FCC, in disposing of the narrow-based Telpak proceeding, could consider from its long-pending private line rate case testimony of AT&T witnesses on relatively minor differences in costs involved in providing multiple channel service — urged by Motorola — or its conclusion in the private line initial decision that the multichannel tariff should be rejected — urged by the Western Union Telegraph Co.

In that connection, Motorola's only direct evidentiary offering was private line tariff material and the multichannel cost evidence from the private line rate case, excluded by the commission at the evidentiary part of the session. The FCC said its action was without prejudice to use by counsel of the multichannel cost testimony in cross-examination. Commissioner Frederick W. Ford emphasized later in the argument that this had not been done by counsel for the parties opposing the tariff.

Ruling Leaves Situation as Before

SO FAR as could be determined initially, the effect of the commission's ruling was to leave the situation as if the hearing and oral argument had not been held — except that FCC members now have had first-hand exposure to several major issues involved in the Telpak proceeding.

It was thought that one possible effect of the FCC decision could be its relationship to AT&T's decision on whether to make the Telpak tariff modifications effective at the end of the suspension period. It had been pointed out earlier at a prehearing conference that the *en banc* FCC proceeding, depending on how it went, could have a bearing on that subject.

Certainly nothing in the FCC's preliminary ruling gave support to any suggestion that the Telpak tariff modifications — which would permit AT&T to provide Telpak by any facilities deemed appropriate, and not only by broadband channel assignments as currently required by the FCC — would not be put into effect on schedule.

The commission's action was in the form of a tentative disposition of the case, and the FCC pointed out it reserves the right to reach a different result when the

Please turn to page 18

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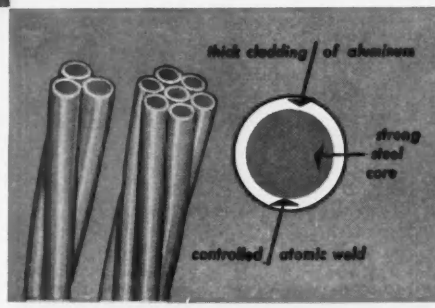

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time comes for action on a formal order. In practice, the FCC rarely reverses a publicly announced tentative ruling.

The proceedings before the full commission were held on two points: Whether service under the revised tariff schedules are distinguishable "in any material respect" from the private line services offered under individual tariffs by the Bell System companies; and whether there are "any material cost differences" associated with furnishing a given number of channels to one customer, "as opposed to furnishing the same number of channels to as many customers."

One witness at the evidentiary hearing was AT&T Assistant Vice President Hubert L. Kertz, who said Telpak is the only Bell System private line service competitive with private microwave systems. Another witness, Aeronautical Radio, Inc., President John S. Anderson attempted to testify on the importance of Telpak and other private line services to Arnic and the airline industry; much of his evidence was stricken by the FCC on complaints of opposing counsel that it was not in the narrow issues specified for last week's hearing.

In addition to explaining how Telpak meets directly the needs of customers who might well otherwise go to private microwave systems, Kertz detailed cost savings to the telephone companies of volume services, and the service requirements Telpak fulfills in distinguishing it from other private line services.

The over-all Telpak investigation is attracting a growing number of parties. The Lockheed Aircraft Corp. and the Douglas Aircraft Co., have asked for leave to intervene, and the intervention petition of the United States Steel Corp. has been granted.

WADS Hearing by FCC

MEANWHILE, with one FCC hearing on a new telephone service — wide area telephone service — or WATS — completed, another was still going ahead as this column was written.

This is the case which amounts to a hearing on wide area data service, or WADS, although technically it embraces a limited tariff covering what is known as developmental line switched teletypewriter service. WADS is due for a general offering in the fall of 1962, when the mechanization of the Bell System's teletypewriter exchange service (TWX) network is completed. Meanwhile, DLSTTS is geared to serve three customers being given a preview of WADS.

Purpose of the advance service, Bell System witnesses have explained in the hearing, is to give it experience with customer requirements and other matters important when full-scale WADS is offered. It has been pointed out that the sudden general offering of WADS next fall would lead to held order and other problems.

Delta Airlines is the only customer being furnished DLSTTS. Delta moved to a new headquarters earlier this year, and the initial DLSTTS tariff was filed to provide it with the service, instead of requiring it to put in another and larger private line switching system at its new location, with the resulting termination liability. WADS switching is done at the telephone company's central office. There are no termination charges, other than a one-month minimum.

AT&T Assistant Vice President Hubert L. Kertz, AT&T's policy witness in the DLSTTS case (he occupied a similar role in the WATS hearing and in the "threshold" Telpak hearing before the full FCC) explained it was then decided after approaches for similar service were made by United Airlines and the Boeing Co., to provide them with similar service, and tariff modifications were filed. They were suspended by the FCC until January 8, and service to the two companies will begin soon after that.

Strongly opposing the new tariff on competitive grounds, the Western Union Telegraph Co. has argued in the hearing that the purpose of DLSTTS was really to obtain two customers, United and Boeing, who presently take private line service from Western Union. Kertz replied that various aspects of service to Boeing and United will be different from those for Delta, and that additional experience will be gained as a result of adding them to the DLSTTS customer list.

Considerable questioning at the hearings — running well into December and possibly after a recess or two into 1962 — also has been devoted to the rate schedule for the service. It is similar to WATS. The country is divided into six zones, but the originating state is included in the first zone service area, and WADS access lines may be used to receive incoming calls.

It seems unlikely the commission would reject the WADS service, in view of what appears to be general feeling — except on the part of Western Union — that the service represents a step forward. It is possible that the FCC might order revision in the rate schedules, although from a dollar standpoint the rate changes would not be large, even if revisions in the weighting schedule were directed.

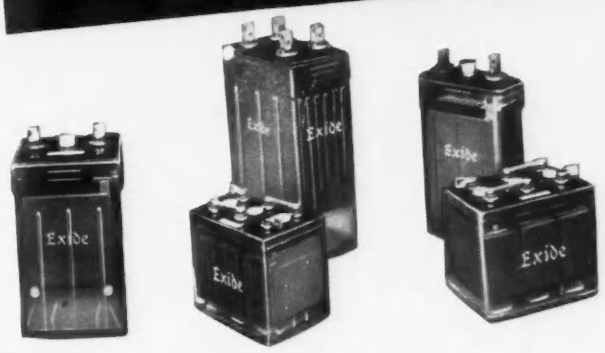
Communications Problems Committee Named

AN 11-MEMBER COMMUNICATIONS Problems Committee of the National Association of Railroad & Utilities Commissioners — including six members of the NARUC Executive Committee, five members who are chairmen of their state commissions, and two former NARUC presidents — has been appointed for the 1961-62 association year.

The enlarged and standing committee replaces the former Special Telephone Committee, which completed its 20-year career at this year's NARUC convention, when it was decided to make the group a standing committee and change its name to reflect the broadened scope of its activities and area of interest.

Ohio Public Utilities Commissioner Everett H. Krueger, Jr., the last chairman of the special group, was named chairman of the new Communications Problems Committee. Krueger also will serve as liaison executive for the group.

Broadest battery line
Pasted plate Tytex with Silvium* or calcium, long-life Exide-Manchex Planté with Silvium, low-maintenance pocket positive nickel-cadmium, and the new 20-year Exide-Ironclad tubular with Silvium.



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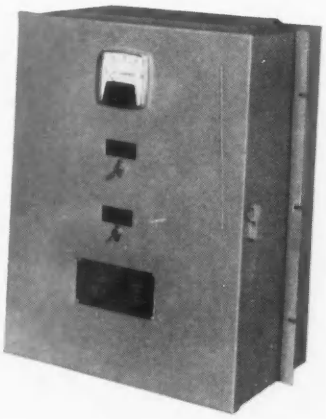

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There is no one battery that gives the greatest economy in all applications. But there is one best battery for your application.

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It prolongs the life of your batteries and rectifiers. Insures lowest cost per year of use. Should be done by trained men.

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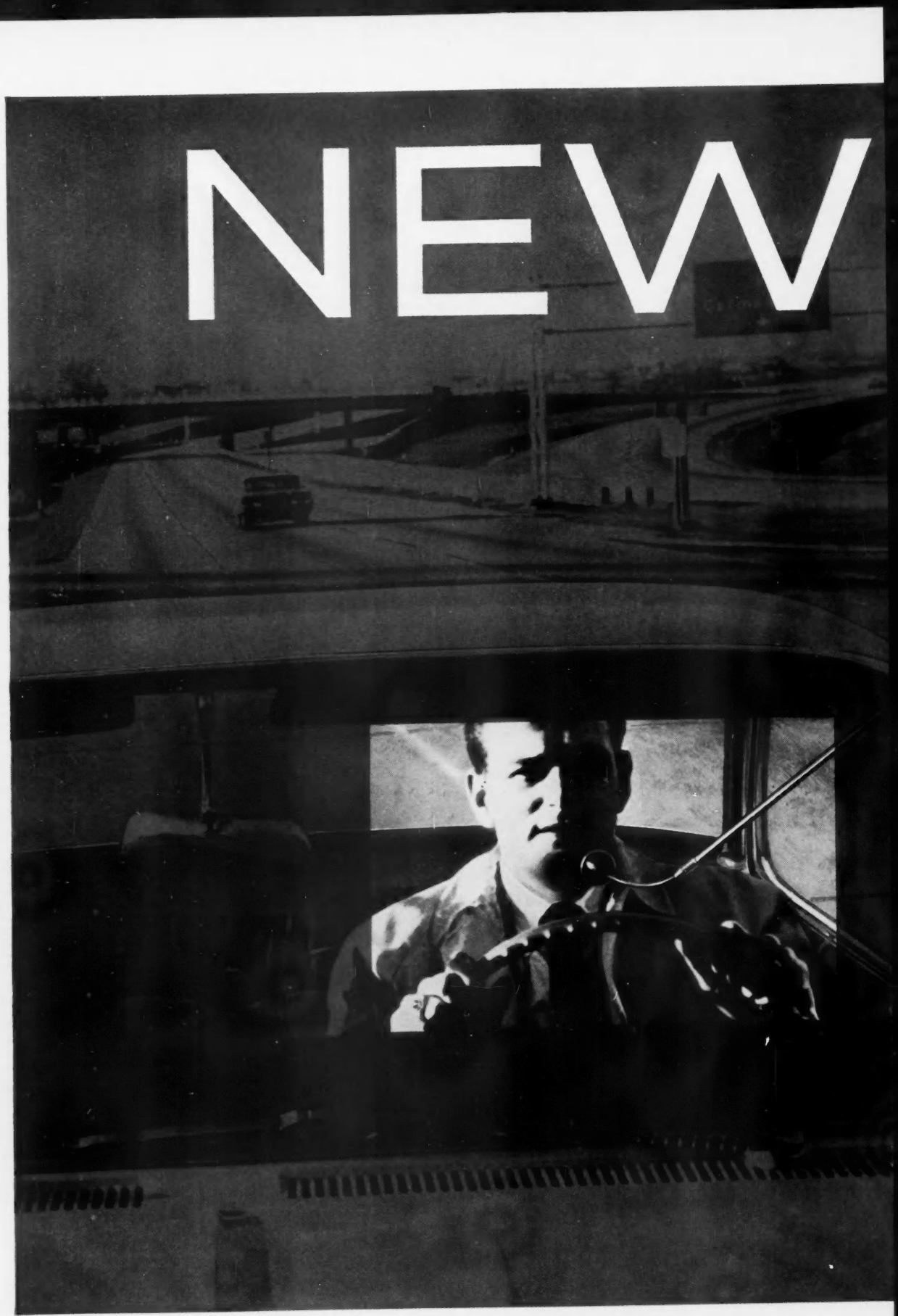

NEW

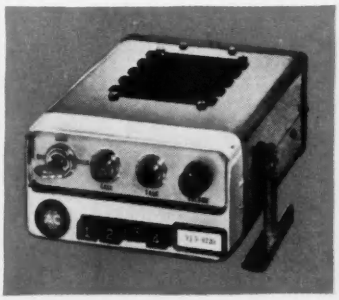
SAFETY DESIGNED *"HANDS-FREE"*!
NOW TALK AS YOU DRIVE!

AChieverfone—a product of AC-Milwaukee Research—introduces a new idea in mobile telephones . . . an idea that makes it safe and easy to talk while driving. A new boom-mounted microphone, push-to-talk foot switch, and built-in speaker make "HANDS-FREE" the most modern method of efficient mobile communications. Now the driver keeps his hands where they belong—on the steering wheel.

No matter where your customer drives, with a car telephone he can call anyone, anywhere. He is in constant contact with his office, customers, suppliers, and home. And now he can telephone safely . . . with his hands at the wheel.

The "HANDS-FREE" system is simple to operate and offers 4-channel selection. Proven thoroughly reliable for trouble-free service, "HANDS-FREE" is unmatched in the market. Write Box 622, Milwaukee, Wisconsin, or call AC-Milwaukee for more information.

Boom-mounted microphone swings up and out of the way when not in use . . . swings down for talking.



Compact control unit contains speaker for incoming voice and has 4-channel push-button capability.

Push-to-talk switch is easy to operate. All it takes is just a tap of the toe—push to talk . . . release to listen.

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LEICH'S TWO TYPES OF MOTEL-HOTEL PABX

Open new profit opportunities for you

Shown are Leich 12-trunk attendant's turret and 40-station message waiting turret.

LEICH GENERAL SYSTEM

Subsidiary of
GENERAL TELEPHONE & ELECTRONICS

Leich's two types of motel-hotel service open new profit opportunities for you in this growing PABX market. You can offer a system to fit each customer's needs.

To serve motels and hotels where an attendant is usually on duty, Leich has designed the 40M and 80M PABX's. They offer a wide variety of services such as two or three-digit dialing between rooms, station metering, and message waiting. Other services are restricted station-to-station night calling, toll diversion, and single-digit dialing to special services such as room service and maid service.

Leich also offers an alternate system, using the standard 40B and 80A PABX's, to serve motels and hotels where an attendant may not always be on duty. When desired, incoming city trunk calls can be answered from *any phone* —and transferred to the guest by simply dialing the proper digits. Especially valuable at night when it is desirable to handle calls from living quarters.

Other services of this alternate system are the same as the 40M and 80M— with two exceptions. Station-metering and restricted night calling are not available.

For copies of Leich's new 4-page sales aid and service feature lists on these two motel-hotel systems, write to Leich.

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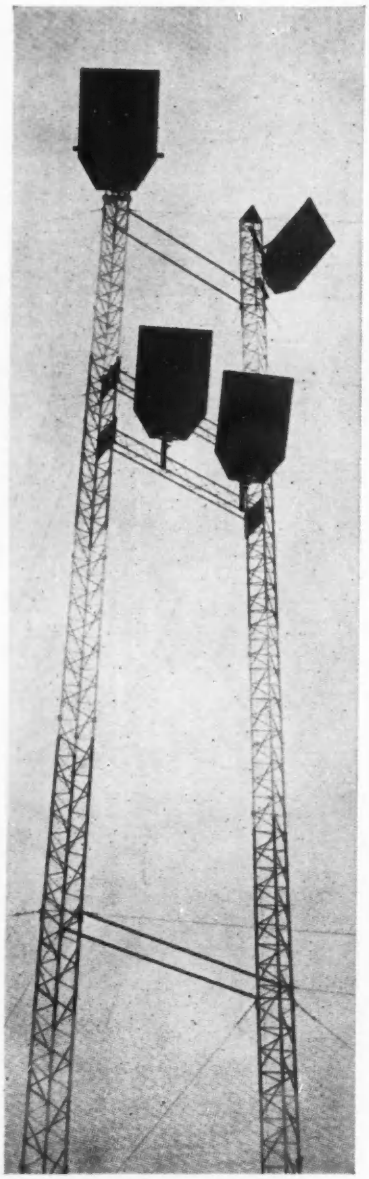

For your micro-wave tower requirements, get the advantages of advanced design, superior workmanship, competent engineering assistance, and complete erection service.

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"Pioneer Manufacturers of Towers of All Kinds"

INDUSTRY OBSERVATIONS

By L. A. GRITTEN

CDO Publicity

AT THE USITA convention, James Kirby, chief engineer of the Oregon-Washington Telephone Company, deplored the neglect of our Community Dial Office buildings. The CDO, he said, is "seldom seen by the management of the telephone company; and the people who do see it every day are our CDO customers."

Amen! Too often these huts full of switching devices are nothing much to look at, and they are located on a side street or alley, unmarked and unrecognized. Few local people even know what purpose they serve.

The CDO should be located on a busy street. It should have big view windows and descriptive signs, well lighted at night. John Customer should be able to watch the relays work, the lamps flicker, the switches rotate and, on occasion, the switchboardman making his tests. Once a week for an hour or two it should be open for inspection by school groups, etc.

That, at all events, will ensure that the little CDO is kept clean and neat, not a throw-all for tools, wire and junk.

A hidden, dirty CDO building is a public relations opportunity lost in a "remote control" area where the company may have no other representation.

"He Flies Through the Air. . "

BEHOLD THE TROUBLE shooter, as he prepares to inspect an aerial cable joint or shake a short out of a rural telephone line, circa 1966: He wears neither belt nor spurs. No tools are draped around his manly form. His tools and testing gadgets are in a box at his feet. To him, the art of working while hanging precariously with one leg hooked around a pole is a folk tale from a forgotten past.

On a flying platform he sails gracefully from the ground to his objective. He hovers in a comfortable position while he does his work.

If this seems farfetched, read about the recent NASA "hovering flight" tests at Langley Research Center. Ten men learned in a few minutes to fly a one-man military "flying platform." Some of them had flying experience; others had none; but apparently that made little difference.

They could guide their platform by shifting their weight, or by means of a control stick that diverted the compressed air streams. Most of them preferred the stick control. (For details, write for A D 259 079 to O.T.S., U. S. Department of Commerce, Washington, D.C.)

Piracy Most Foul

WHILE OUR attention is diverted by such trivia as 50-megaton bombs, worse horrors threaten. John Thompson, a Toronto journalist, plans to bombard England with a 24-hour radio commercial broadcast. His station will be located on a 70-ton former fishing boat, anchored beyond the three-mile limit in the Thames estuary. Government regulation cannot touch him and he will pay no license.

Similar radio pirates are already operating off the shores of Holland and Sweden. We may be next. Who knows? The perpetrators of our current TV commercial atrocities may move out to sea, where FCC protests or the coming Senate investiga-

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BATTERY CHARGERS

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YOU GET THE MOST ADVANCED, ECONOMICAL, & RELIABLE EQUIPMENT AVAILABLE.

Features:

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Cook Electric Company can supply single phase battery chargers to fit any installation at a low capital investment. They require no periodic adjustments and are quiet operating units because they have no moving or vibrating parts. An adjustable, closely regulated floating voltage is supplied within the current charging range of the battery, and equalizing is obtained by a toggle switch mounted on the control panel. Floating and equalizing voltages are regulated by a magnetic amplifier, and a current limiter restricts the maximum available current to a safe preset value without releasing the breaker. These chargers do not require forced cooling and the result is more silent dependable performance. The unit has a closed loop control circuit, and the controls, connectors and fuses are conveniently located inside the attractively finished cabinet. Standard equipment includes an on-off control, input and output line protector, an output ammeter and a control circuit disconnect relay.

Send for the latest Cook Telephone Equipment Catalog

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Since 1897

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LINE CLEARING
PRUNERS

FAST
CUTTING
DEPENDABLE
HEAVY DUTY

Designed and manufactured with utility line clearing in mind. Rugged, heavy duty tools that are famous for their fast, easy cutting action.

POLE PRUNERS

No. 11
A strong, durable, easy cutting pruner head that cuts up to 1" branches with ease. Open stock spruce extension poles in 6 foot sections, with telescoping aluminum joints.

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Cuts up to 1½" branches. Pruner head is malleable iron casting, husky, unbreakable. Smooth, easy cutting action.

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Heavy duty, fast, easy cutting loppers designed for utility use.

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Compound lever cutting action, smoothly slices through 1¾" to 2" branches.

Nos. 525, 530
The famous "Tiffany" pattern lopping shears 25" and 30" models. Cut branches up to 1¾".

PRUNING SAWS

No. 1826
26" blade of Sandvik Swedish steel especially designed for tree work. For those spots where a chain saw can't operate.

Send for literature and additional information on pruning tools of all types.

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Quality Tools
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tion won't bother them at all. Let us pray for bigger and better hurricanes, or an open season with an attractive bounty for their scalps.

Prophets and Profits

RECENTLY we received two letters from stock market cognoscenti. Each admitted he was a prominent and important economist. Each stated this country is now in the birth throes of another great boom. To become rich we need merely send our check for his list of selected stocks that . . . .

A few hours later a letter from another economist, also renowned, of course, promised us a crash in stock and commodity prices in the near future and accompanied by worldwide deflation and a sharp drop in the American standard of living. But there will be exceptions, he said. To grow rich out of the national calamity, we need merely send our check for his list of selected stocks that . . . .

Will Rogers summed it up: "If all the economists in this country were laid end to end, it'd be a heluva good idea."

"The Better 'Ole"

A NEIGHBOR asked us: "Are the telephone people advance-wiring or installing phones in atomic fallout shelters?" We passed that one to the sales manager of a company operating in a strategic area that is almost certainly pinpointed by the Russian missile system. His answer:

"What fallout shelters? I don't know of any and I doubt if there are a dozen in our entire area. In any case, who thinks we'll have a telephone exchange after an atomic attack?"

That started us on an informal poll of the opinions of people we know or chanced to meet. Quite unscientific, of course — but very revealing.

The concensus could be summed up: "Nothing doing! Community shelters might be OK, but no family shelter for us. Why should we cower like beasts in a hole, perhaps fighting for our right to be in it, in doubt and misery — and then eventually crawl out into a world of horror, our friends either dead or dying of leukemia, everything worthwhile destroyed or tainted with the threat of death and most likely run by gangsters? No, thanks, we'll take ours fast, in the open."

Christmas, AD 1561

THIS CHRISTMAS we shall ride the fourth dimension. We shall be four centuries away during part of the day. Shortly before breakfast time, a gay party of Elizabethan gallants and their ladies will stroll songfully past our room, greeting the day with carols that were old before the Mayflower sailed.

They will be dressed in 16th Century costume. The ladies will billow in flowing gowns of silks, satins and velvets in every hue of the spectrum, with all the concomitant furbelows and frills. The men will be equally colorful in thigh-length hose, puffed breeches, slashed doublets, velvet hats, feathers and flowing locks.

They will make their way caroling past every room in the great hotel, finishing their concert in the Coronet Lounge. Again at dinner time, with "waits" and masked "mummers," they will sing their way through the throng of guests to the fireplace.

They will drag a Yule Log that will be duly burned in the ancient style, with incantations and offerings of wine. Then more carols and a final parade, carrying the Boar's Head past the diners in the banquet hall.

Every Christmas Day, exactly the same ritual is staged in the Empress in Victoria, B.C., the beautiful, spacious old hotel where our Oregon and Washington Independent Telephone Associations held their convention last summer.

To Sir Francis Drake, Sir Walter Raleigh and their contemporaries this was merely a familiar routine. But to us every year it is an hour or two of happy escape from our over-mechanized century, in the most delightful resort we know.

To you and yours, a Merry Christmas.

Model LT15 SUB-CYCLE Transistor 5-Frequency Ringing Generator

...NEW by LORAIN

Now, for the first time, a d-c operated, transistor ringing generator having the Lorain deluxe features and yet priced to fit the budget of the smallest exchange. The new LT15 SUB-CYCLE ringing generator, having an output of 15 watts, will handle up to about 2,000 lines. The units may be paralleled to accommodate expansion of facilities.

QUALITY FEATURES

Sine-Wave Output—Avoids cross-ring and assures quiet circuits.

Self-protected against overload, short circuit, trip battery short or cross connection of generators.

Precision frequency adjustment.

Modulated audible ring-back tone—Available separately or may be superimposed on the ringing voltage.

Essentially flat regulation from no load to full load.

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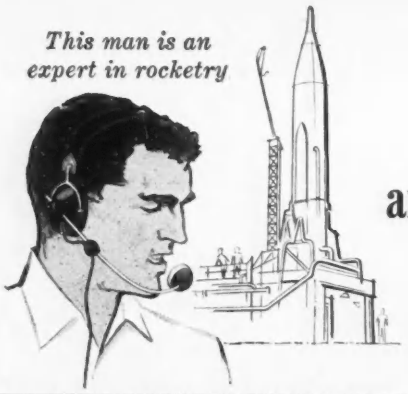

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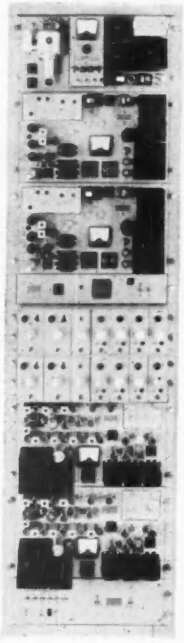

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■ Discussing underground telephone construction, W. T. Gillingham stated — *"The advent of a regular December visitor to the northern states — Boreas — always makes the telephone engineer hark back to his foresight in decreasing his overhead worries by underground conduit installation, or curse the conditions that kept him from doing it . . ."*

■ Sarah Elizabeth Brown told her readers — *"It is my pet belief that we are all pessimists today and optimists tomorrow! . . . If you want to know what's wrong with the country, charge it to politics. Businessmen know this. They also know that there will never be a satisfactory change in conditions until they have time to actively participate in the offices . . ."*

■ A report from Germany stated that *"If one desired to address the assistant inspector of the telephone department of state railroads he would call him 'Eisenbahabetriebtelefoninspektionasistenten.'"*

■ An automatic telephone message recorder, invented by Albert Baumgartner of St. Gall, was announced. The instrument recorded telephone communications in the absence of the called party, and reproduced the messages. The apparatus consisted of a microphonic telephone, and a dictating machine with cylinder and sound interceptors.

■ The New Jersey Telephone Herald Co. began furnishing daily news service by telephone. News was telephoned continuously during the day from a central transmitting station to subscribers' instruments in residences, department stores, and restaurants.

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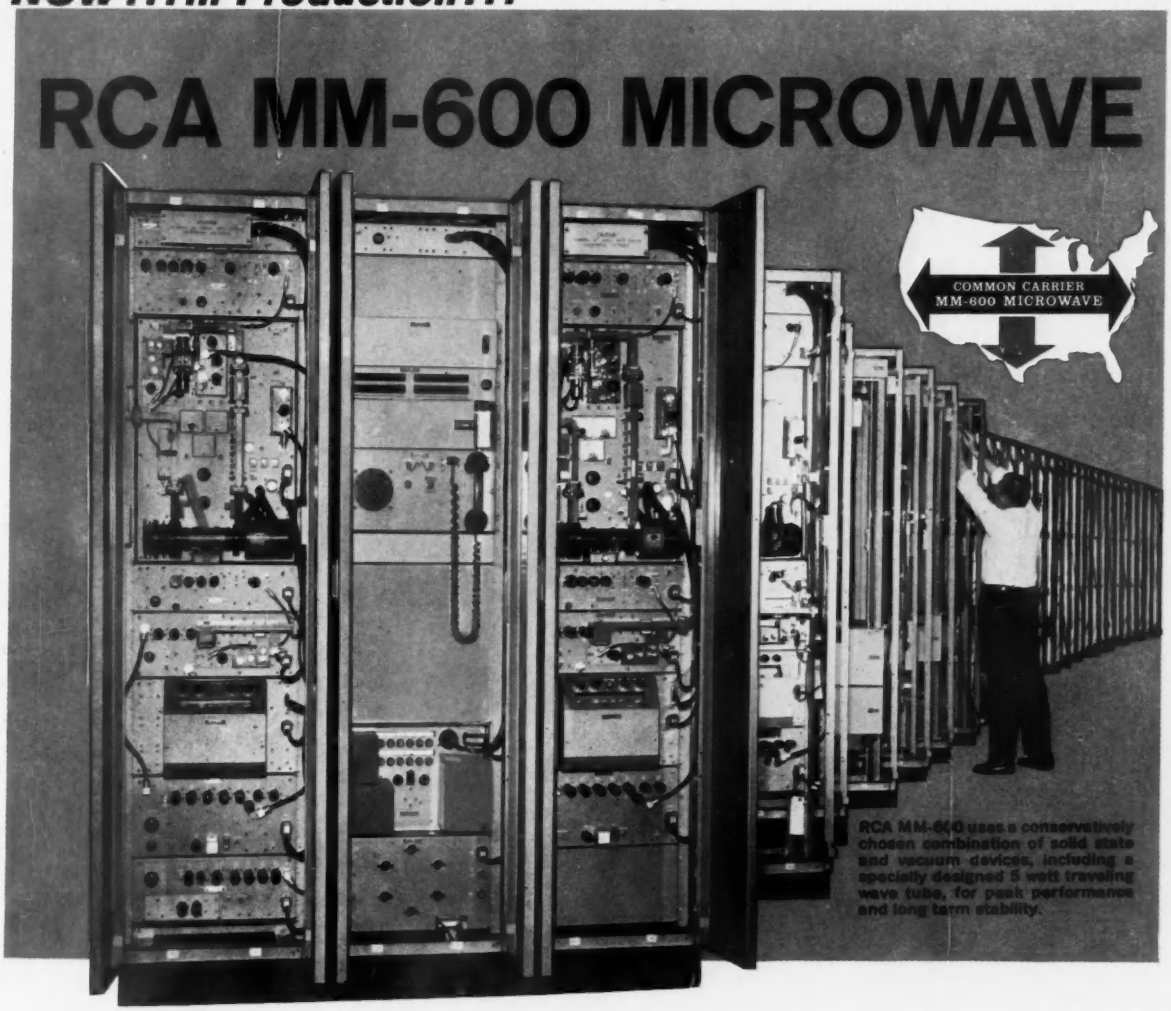
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GRASSROOTS OPINION

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Survival

"Civilizations of the past have been shattered, but like the moss on the rock man is still here . . . Does this mean that our civilization could survive an atomic war? No, not necessarily. But it should suggest that were we to go down in defense of freedom, all would not be lost. Though we may have to enter into the valley of the shadows, we would betray the human race were we to be frightened into giving away our liberty." —*Providence (Ky.) Journal-Enterprise.*

Coming Event

"If you are too busy to take an interest in government, feel that getting mixed up with politics is bad for your business or beneath your dignity, then at least take time for one thing . . . Teach your children to count in rubles." —*Washington (D.C.) Roll Call.*

More Brainwashing

"There is more brainwashing going on in America than in any other nation this side of Russia. There are more plans being devised to deceive the public than in any time in history. We are brainwashed into believing that we can spend ourselves into prosperity, that we can maintain financial stabilization by going deeper and deeper into debt, that the national debt is of no significance — just a long line of meaningless digits . . . No wonder babies come into the world crying. They're held upside down, spanked and have a $1,675 debt hanging around their neck. Our debt is larger than that of all the nations of the world put together." —*Star City (Ark.) Ledger.*

Here's a new Tool for your BOOK KIT!

TELEPHONE ENGINEER & MANAGEMENT's new "Telephone Handbook for Managers and Plantmen" is the first of a new series of telephone reference books containing selected reprints of TE&M's exclusive feature articles.

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Thoroughly illustrated with tables, charts, and on-the-job photographs, the contents of *"Telephone Engineer & Management's Handbook For Managers and Plantmen"* have been carefully selected to provide each user of the handbook with "how-to-do-it" information on a wide variety of telephone subjects. Through concisely written, easy-to-understand articles, the handbook will provide ready answers for questions that may arise concerning — Desk Instrument Mounting; Drop Distribution; Drop Entrances; Drop Wire Fixtures; Drop Wire Locations; Drop Wire Runs; Drop Wire Spans; Inspection of Outside Plant; Installation Procedures; Maintenance of Outside Plant; Noise Conditions; Pole Yard Arrangements; Poles, Average Weights; Poles, Framing Details; Poles, Stacking Methods; and Regrouping of Rural Subscribers.

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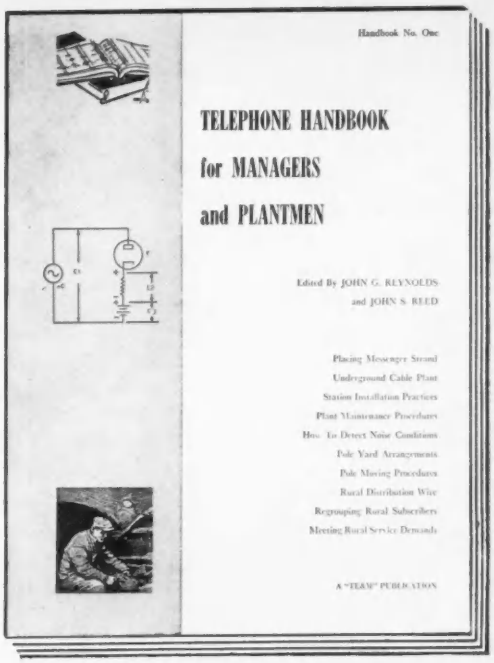

Oregon Independent Telephone Association's "Newsletter" recently published a review of TE&M's new Handbook and stated — "This should be on the desk of everyone who is concerned with up-to-date telephone service."

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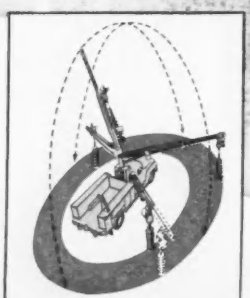
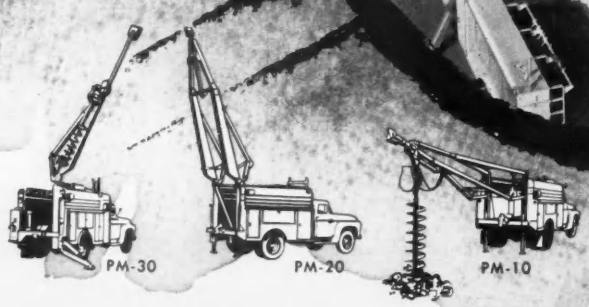


PM-40 (Operating Range)



PM-30 PM-20 PM-10

EDITORIAL

"... Merry Christmas to You!"

■ **WE REALIZE our Christmas salutation may reach you a bit early. But since this is the last issue of *Telephone Engineer & Management* before Christmas, we must say it now or not at all. And we want to say it.**

We know it is not customary to mix business with holiday salutations, but there is one thing — somewhat in the nature of unfinished business — that we need to get off our mind.

Certainly the year-end figures will prove the telephone industry made considerable progress in a number of directions during 1961. New installations of telephones have continued at a fast pace. Additions to equipment and plant facilities, both exchange and toll, have been large. There has been substantial improvement in service. Exchange rates more in keeping with the present high level of expenses have been obtained by a number of companies. The integration into the telephone industry of new communication developments is taking place rapidly. The farm telephone situation is much improved. Valuable and lasting progress has been made in other important things.

But despite all these favorable marks on the credit side of the industry's ledgers, in the final months of the year we noted an increase in unfavorable newspaper comments regarding (1) *companies seeking rate adjustments*, and (2) *failure of telephone companies to expand or improve facilities as fast as the newspapers thought they should be expanded or improved.*

We realize the industry would be operating in some sort of a dreamy Utopia, if every user of the telephone and every newspaper reporter and editorialist knew all about the telephone business. If such a pleasant state of affairs existed, then it is quite likely that some of the complaints made about rates and services would not have been made.

But telephone users in general, and newspaper people in particular, do not know all about the telephone business, nor can they be expected to have such knowledge. Therefore, *the business must be operated on the basis that they do not have such knowledge.*

For instance, during any time of shortage of telephone facilities, many applicants offer to obtain and supply a telephone instrument. They do not realize, of course, that the shortage is in central office or plant facilities, and also that the telephone used must be the type of instrument suitable for that particular exchange.

Another situation peculiar to the telephone business is the increase in the cost of supplying exchange service as the size of the exchange increases.

That there is actually such an increase in cost per telephone is, of course, a fact. But it is likely that most telephone subscribers believe any resultant higher rates are imposed by the telephone company simply because the subscriber can talk to more telephones.

It is, it seems to us, up to the telephone industry itself to inform and educate the public about matters of this kind. It also seems to us that efforts in that direction, carried on consistently, will result in benefits to both the telephone company and the public it serves.

There is one very significant angle to all this. Time after time it has been shown in rate cases that public opposition is usually more interested in obtaining the best service possible than it is in holding down rates.

A better public understanding of the nature of the telephone business, and of the necessity for higher rates under present-day conditions, will help the telephone company supply the kind and amount of service the public wants.

Bringing about a better public understanding of the telephone business is, of course, only one of the problems the telephone industry will carry over into the new year. However, we believe it is one troublemaker the industry must continue to attack in 1962. The continued prosperity of the telephone industry in 1962 may well depend to a considerable extent on its ability to improve public understanding of the telephone business.

Merry Christmas and Happy New Year!

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LUKE: 2, 14

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Developmental model of Bell System communications satellite is readied at Holmdel, N. J., for transmission experiments. The satellite, intended for experiments in relaying of telephone calls, is scheduled for launching next spring.

Let Private Enterprise Do The Job

By JOSEPH J. BROWN
Chairman, Nebraska State Railway Commission

Historically, the job of providing communications in this country, and from this country to other parts of the world, has been done by private enterprise. Under this private system the U. S. A. has become the world leader in communications.

TWENTY YEARS of growing international problems and tensions have increasingly focused the reliance of Americans on decisions and actions of their federal government.

Dangers of communism and the rising emphasis on national defense have enlarged the impression that only the central government has the answer to problems, be they international in character or domestic. This has resulted in increased acceptance that only the federal government can solve our nation's ills.

In a free society, the central government cannot be and should not be all things to all people. The American people must soon draw an important line — be-

tween what they want to do for themselves and what they want government to do for them.

Equally important, they must again distinguish as between those governmental functions that should be assumed by city and state government as against the ever-expanding federal authority.

The question of whether and how this line will be drawn depends on many kinds of thinking, naturally, but the final decision rests with the American people — a decision which will profoundly affect the future character of our society.

As one of the most heavily taxed nations in the world, we must soon face the fact that there are limitations in what central government can do, from the standpoint of dollar costs and the authority to direct our society.

Beyond this is the even bigger consideration — of how much we can permit the federal government to do without nullifying the check and balance system set up by the Constitution and without destroying the initiative, creativeness, and courage of Americans.

Basic Separation Required

A BASIC SEPARATION must be made, calling for sound judgment, as between those functions that can be best carried out by private enterprise or consigned to government if that is the only way the public interest can be served. Each instance must be examined separately.

We must expect that the issues in each such examination will be heavily fogged by the conflicting interests and interpretations common to our political democratic processes.

Answers are not always crystal clear. Weighing of the factors involved should not overlook the founding governmental principle that government in this country was entrusted with only those duties that the people were unable to perform for themselves.

A good example of this conflict is the current storm raging over who should build, own, and operate the international communication satellites that are on the horizon.

Historically, the job of providing communications in this country and from this country to other parts of the world has been done by private enterprise under government regulations. Under this private system we have become the world leader in communications. As a nation, if we still believe in individual enterprise, I see many sound reasons for leaving this responsibility in the hands of private industry.

The biggest of these reasons is the efficiency of the communications system this country has built. No one questions that it is the best and most extensive communications network in the world. It has cost in the region of $30 billion, not tax dollars, but private investor dollars.

Annually the communications industry in the United States pays in federal taxes alone about $1,184,750,000, and collects and pays $660 million in excise taxes. States and communities receive another $662 million of tax income from it. The industry accounts for about 1.9 per cent of the national income, giving high-quality employment to 841,000 men and women.

Not Gained Through Over-charging

THIS BIG CONTRIBUTION of communication to the American economy has not been gained through overcharging the public. To the contrary, customers of our communications companies pay a smaller portion of their average income for these services than do people in any other country in the world. In addition, communication takes less of the average worker's income today than in earlier years.

The telephone industry provides a fine example of effective teaming of private business and government regulation. Communications companies in this country under reasonable incentives have expanded at record rates and made widespread improvements in the quality and variety of their services under the encouraging, watchful eyes of the regulators.

As recently as 30 years ago, this country had about 20 million telephones. Most calls were operator-handled, and most were transmitted over basic two-wire electrical circuits. The industry was already big, but electrically and mechanically it was still fairly simple.

Today, the equipment and lines which make it possible to interconnect any of the 65 million telephones in this country and to extend connection to almost every other telephone in the world form one of the most complex research, engineering, and building achievements of all time.

The telephone system of the United States is the product of thousands of types of research and engineering talent. It has been called the world's largest computer.

Private communications companies have demonstrated their capabilities in many ways.

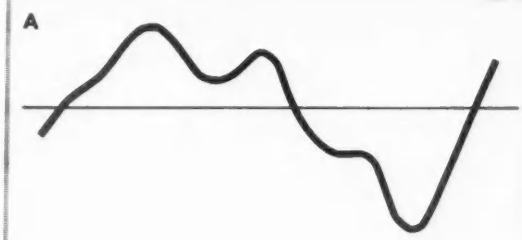
These companies have the required research and engineering facilities and already have invented and developed equipment necessary to successful operation of communication satellites. I feel certain that assignment of full responsibility to the government would yield a less satisfactory result.

Job Done by Free Enterprise

THIS IS A JOB to be done by free enterprise working under the incentive of a reasonable profit, with the knowledge that as a public service the industry can succeed only to the extent its services please the public and that under regulation its profits would be limited to only a reasonable level.

Assuring this kind of public satisfaction in its service is the responsibility of government regulation. I maintain it has worked exceedingly well in this country and serves as a general testimonial to the values of a democracy based on maximum development of the free private enterprise system.

Please turn to page 47



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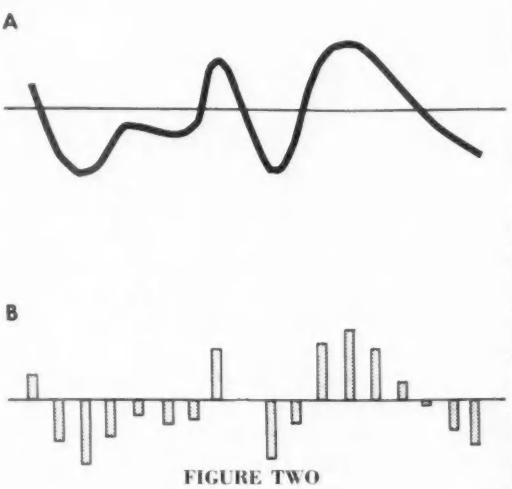

FIGURE TWO

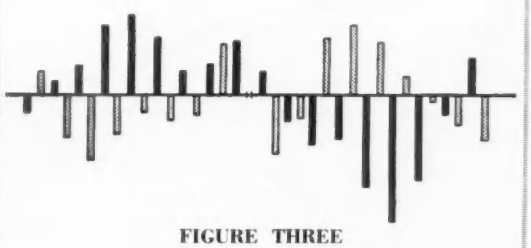

FIGURE THREE

The path that doesn't have to be there all the time, time division is shaping up as one of the techniques to create flexible telephone plant with minimum wire. The author, explaining frequency and time division, points to future applications in T1 carrier and waveguide systems and says these are outmoding original concepts of circuits and switches.

TIME DIVISION

FREQUENCY DIVISION is one of the grand ideas of telephone communications. Most of our long haul circuits are obtained by frequency division. We are beginning to use frequency division techniques in the interexchange plant.

And one of the most significant technical changes in the telephone business in the next few years will probably be exploitation of a competitive technique: Time division.

Frequency division permits deriving many *separate* voice circuits from a pair of wires, coaxial tube or a radio channel. We take this for granted, but it's a remarkable technique. And while we sometimes talk as though the *separate* channels are distinct, actually, they aren't.

Take a pair of wires with the carrier system on it carrying 12 voice circuits. At any point on the wires at any given time the potential has only one value. That value represents the sum of all conversations in the carrier system. How do we ever separate the conversations all mixed together on the line?

We do it in the carrier terminals. The carrier terminal consists of a spectrum analyzer that performs certain mathematical operations on the single signal coming into the terminal and separates the signal into distinct conversations put on the line by the carrier terminal at the other end.

In these mathematical operations certain precise steps have to be carried out. This requirement reflects itself in the need for accurate, stable filters of precisely prescribed characteristics and highly linear amplifiers. Only because engineering technology has produced economically precise filters and linear amplifiers and modulators, can we afford to take frequency division for granted.

Next page please

By J. H. FELKER,
Assistant Chief Engineer,
American Telephone & Telegraph Company

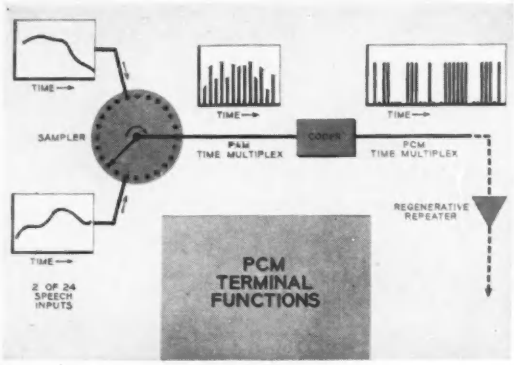

FIGURE FOUR

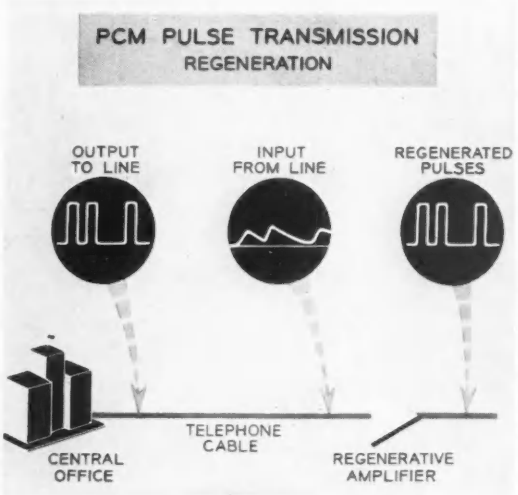

FIGURE FIVE

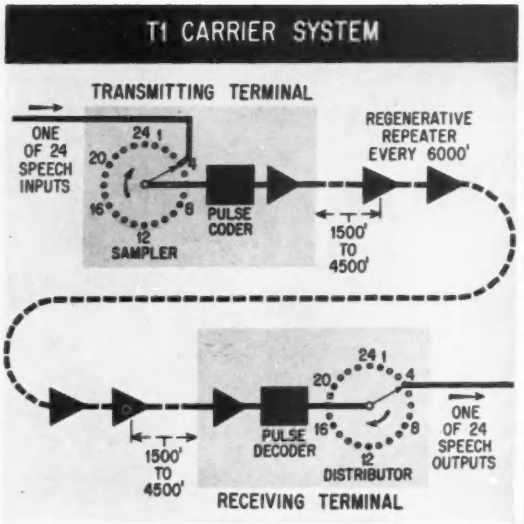

FIGURE SIX

The idea of linearity is simple and fundamental. A device is said to be linear when, in the face of a rising signal, it reacts to the last increment of signal with the same vigor and fidelity it does to the first increment. Linearity is the ideal in electronic devices. It is the horn of plenty out of which comes the art of frequency division.

If an amplifier in a frequency division or carrier system were not exactly linear, the single potential mentioned earlier would be distorted in going through the amplifier. And the carrier terminal or the spectrum analyzer would find pieces of individual conversations mixed up and various false tones and noise generated as a result of non-linearity in the amplifier.

Channel Limitations

WE SOMETIMES get this phenomenon in transmission systems. A single, strong signal in a 600-channel radio system may carry an amplifying stage into overload, not in the power sense but in causing the amplifier to operate in its non-linear region and spoiling transmission characteristics of all 600 channels.

The principal limitation in the number of channels derived from broadband systems, such as radio, is often not bandwidth but is generally found in loading or linearity characteristics of amplifiers in the system. This is true despite our thinking of bandwith as the fundamental description of transmission devices.

This is not without significance to some non-technical areas of the telephone business. It's one reason why tariffs for communications channels have to be written in terms of the use for which they are suitable rather than bandwidth or other technical parameter. This becomes more apparent in the case of time division.

Frequency division technology is highly developed. Required components have been in production for years. Enough specialists understand the way the systems work to keep them operating closely to the way we assume they will work.

But now a new technique—time division—comes along, using new components. We don't have production experience with these components. We have reason to hope they can be much cheaper than components required in typical frequency division systems. And time division seems to lead to an integration of transmission and switching techniques in a fashion we've never seen before. Finally time division seems basically simpler than frequency division.

Uncomplicated Concepts

INSTEAD of being concerned with complex operations, such as spectrum analysis, we're involved with such uncomplicated concepts as accurately timed intervals and simple regeneration of individual pulses of energy. If we've gained something in the simplicity of these ideas, we'll have done considerable violence to such concepts as a channel, a circuit, a path of certain bandwidth.

Such words had already lost much of their integrity in

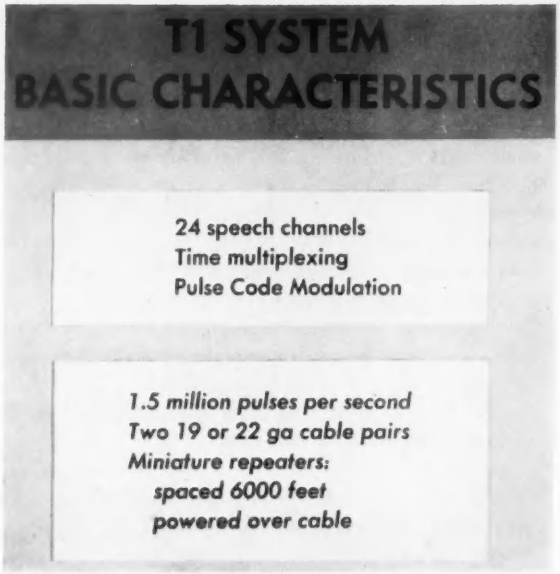

FIGURE SEVEN

the days of frequency division. In the days of time division, means for transmitting information may be discontinuous, time shared, protected by redundant codes, etc., but results will be the same.

People will be able to talk to people as though they were face to face. The quality will be even better than it has been in frequency division systems. Also since basic facilities are designed to carry *bits*, elemental building blocks of information into which all signals—TV, facsimile, computer data, voice—can be decomposed, these facilities can be applied flexibly to many kinds of services.

Figure 1-*A* shows a voltage varying with time. *Figure* 1-*B* shows a series of pulses each proportional to the amplitude of the continuous wave at the corresponding time. Assume these pulses or samples occur every "t" seconds. Duration of pulses can be as short as we wish.

To what extent does the discontinuous signal made up of samples taken every t seconds faithfully represent the original signal? The sampling theorem, the fundamental law underlying time division systems, tells us the samples taken every t seconds represent the signal as accurately as the signal would be represented after it had been through a filter of bandwidth $\frac{1}{2}t$.

By taking samples of a signal at a rate equal to twice the highest frequency in the signal, we have an alternate way of representing the signal. The advantage is: The samples can be very short. Many samples from many different signals can be sent down the same path. In effect, the path is time shared.

Figure 2 shows another continuous wave converted to samples. *Figure* 3 shows a combined pulse train representing both sequences. By a switch in the terminal which alternately routes the pulse to different circuits, we can separate the two individual pulse trains.

The sampling theorem tells us all information sent through a 4,000-cycle band in one second can be completely represented by 8,000 samples. Suppose we wished to transmit 24 such messages through a pair of wires. The pair of wires could do it by transmitting 24 x 8,000 samples a second. Each sample would go into a separate time slot of 1/192,000 of a second.

Successive samples representing message number one would go in time slots number 1, 8001, 16001, etc. Samples representing message number two would go in time slots 2, 8002, 16002, etc. All samples go down the same pair of wires. At the carrier terminal a switch connects each of 24 different outgoing lines in sequence to the transmission line for 1/192,000 of a second, getting around to each output circuit every 1/8000 of a second. In time division, as opposed to frequency division, instead of having filters to unscramble conversations, we have switches and timing circuits. These are things we believe the solid state arts permit us to do economically.

The elementary time division system described is called PAM (pulse amplitude modulation) because each pulse is proportional to the amplitude of the signal represented. Such a system places requirements on linear amplifiers, since a signal will be distorted if a high-level sample does not get the same amplification as a low-level sample.

Next page please

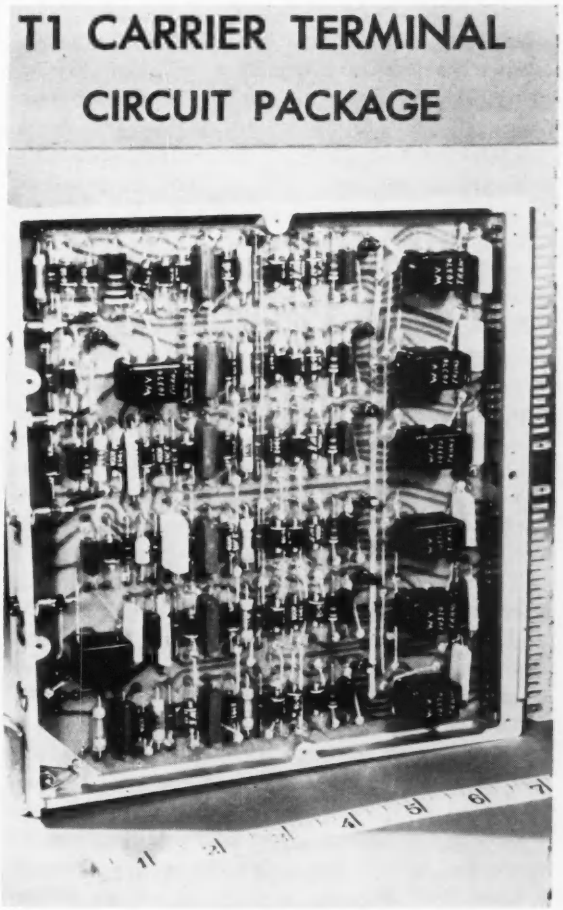

FIGURE EIGHT

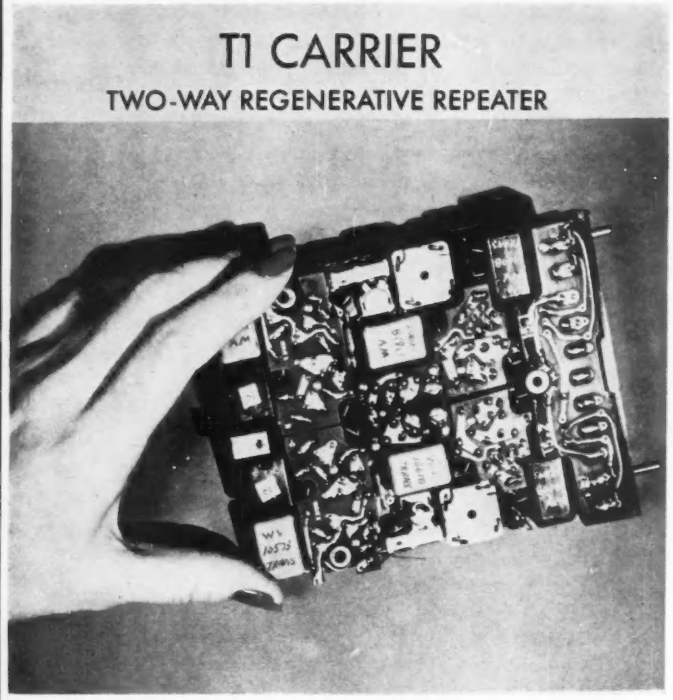

FIGURE NINE

Note that nonlinearity will not introduce crosstalk between channels, as it does in a frequency division system. This is because the amplifier handles different signals at different instants rather than amplitudes.

A more fundamental, rugged way to transmit samples is to convert each one to a code. Have a sequence of pulses representing a sample of 9 volts, for one example, and a different sequence representing a sample of 9.5 volts, etc. Such a system is called PCM, (pulse code modulation) shown in *Figure* 4.

It may seem inefficient, since to send a sample, we now have to send a number of pulses instead of one pulse. This is true, but in pulse code modulation, we have simplified the requirements of our system.

In return for sending more pulses, all we have to ask our system to detect at any given time is whether or not a pulse is present. See *Figure* 5. This is much simpler than asking a system to determine the amplitude of pulse.

If a smart engineer — who'd been away 30 years — looked over the shoulder of a designer of a pulse code modulation system, he'd probably say, "You must think bandwidth grows on trees, the way you waste it in sending all these pulses around."

Such an observation would be a shrewd one. As I mentioned, even in frequency division systems, the real limitation on the number of channels that can be derived is not bandwidth.

In today's technology, cheap solid state amplifiers — consuming so little power they can be operated at a distance from the basic power plant — are making it possible to enlarge the effective bandwidth of transmission facilities far beyond expectations we might have had 30 years ago.

The Western Electric T1 carrier system, with prototypes now under field trial, is a good example of these principles (*Figure* 6). This system will use ordinary cable pairs put underground in many cases 40 years ago and thought of as being narrow band facilities. By equipping these pairs with regenerative pulse amplifiers, we can transmit information over the pairs at 1.5 million pulses per second.

A 4,000-cycle per second voice circuit is a good quality circuit. According to the fundamental sampling law, we need to send 8,000 samples a second to create the equivalent of a 4,000-cycle band. Coding each sample into a 7-bit code, we can send the 8,000 samples in 56,000 time intervals.

If our pair of wires plus regenerative amplifiers can handle 1½ million bits per second, we find we can send 24 voice circuits over that pair of wires. That's what we do in the T1 carrier system, *Figure* 7.

A typical circuit package from the carrier terminal is in *Figure* 8. *Figure* 9 shows a two-way repeater. A case which can mount 24 such repeaters is installed in a manhole in *Figure* 10. (A high degree of reliability

FIGURE TEN

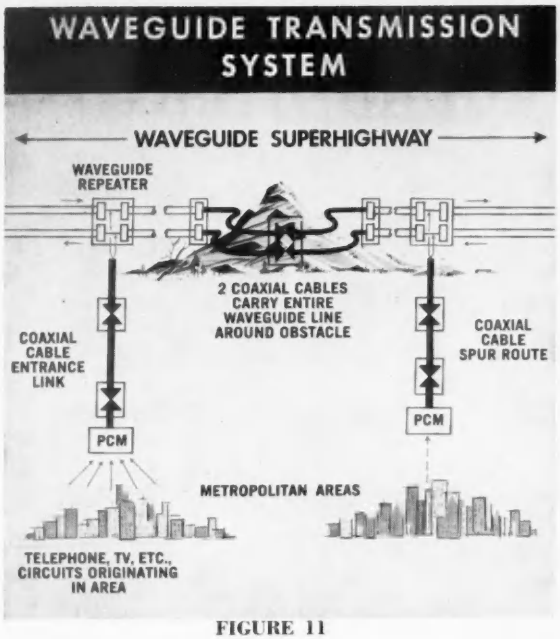

FIGURE 11

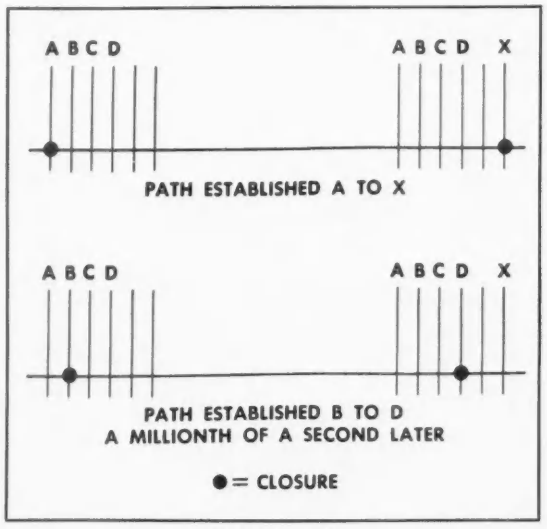

FIGURE 12

is required to justify placing repeaters in manholes at one-mile intervals.)

While we believe the necessary reliability has been achieved in T1, we expect it will represent a challenge to plant and engineering forces until the many new devices and principles in it have been well understood.

Look at T1 as a provider of circuits. What kind of circuits are they? How could they be described? As voice circuits, they have a bandwidth close to the nominal 4,000 cycles. We're used to thinking of voice circuits as being good for several thousand bits/seconds data speeds. But these T1 voice circuits handle 8,000 7-bit codes a second!

We believe this extra *data dividend* of T1 carrier will be important. We believe T1 will be a flexible tool in providing various combinations of voice and data services.

The T1 system is only the beginning of PCM. It's a short-haul system designed for interexchange trunks up to 25 miles in length. By refinements in design of the repeaters, the length of haul could be extended. Impetus to do this may come from data transmission.

New PCM systems will be designed. For several years Bell Telephone Laboratories has been working on a waveguide transmission system. In a single pipe, we can get a bandwidth equal to twice the entire usable radio spectrum.

The bandwidth has problems associated with it. Imperfections in the pipe may lead to spurious modes of propagation. We believe the way to avoid these problems is to use as rugged a transmission system as can be designed.

PCM is the answer. A block diagram of the system we are working on is in *Figure* 11. Such wide band systems will require high-speed pulse transmission. We are thinking of 80 channels, each handling 160 million bits/second.

A conventional space division switching network is in *Figure* 12. At each crossing of lines a switch is represented. Closing these switches, we can set up various paths through the network. In the time division network now under discussion, there aren't as many switches; and they're not permanently closed during a conversation.

If Customer A wants to talk to Customer X, switches A and X are closed momentarily 8,000 times a second to permit a sample of the speech wave to be transmitted. If these samples are sent through a low pass filter, the result is a faithful 4,000-cycle transmission path. At different moments other pairs of switches can be momentarily closed 8,000 times a second and other paths set up.

If a sample can be taken in a millionth of a second (*Figure* 11), 125 connections could be established before it was time to return to the first call being *switched*. Call-carrying capacity of the time division network can be increased by reducing the time interval; each switch remains closed.

In a time division network, since pulses aren't being transmitted far, PAM techniques generally will be rugged enough. If crosstalk became a problem, PCM could be used.

It's probably clear, if the switch at one end of a PCM transmission system were made to hop according to switching instructions rather than to stay in step with the switch at the other end, we'd have a combined transmission and switching system.

One challenge of future telephone networks will be optimum integration of switching and transmission via time division to create the most flexible plant with the minimum of copper in it. As this is done, such ideas as a circuit being a pair of wires and a switch being a connecting device — providing a continuous path — will retreat further into history.

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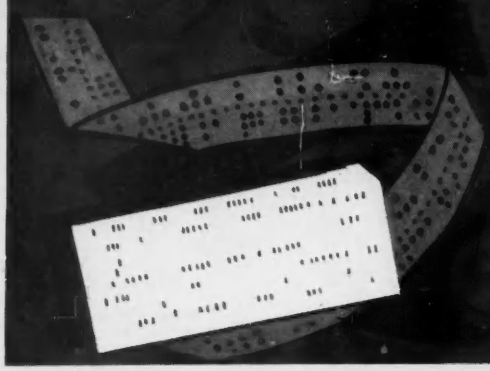

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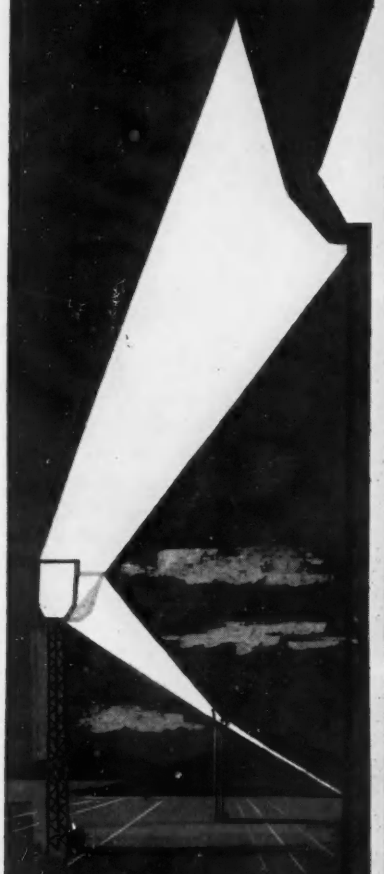

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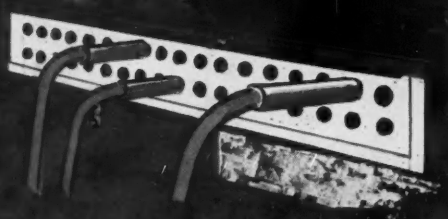

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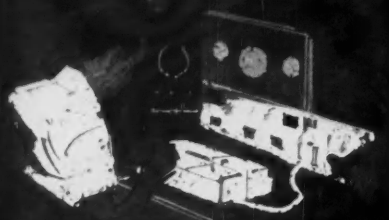

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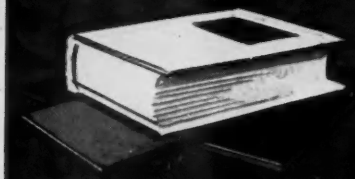

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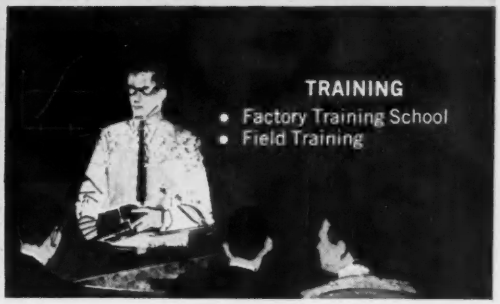

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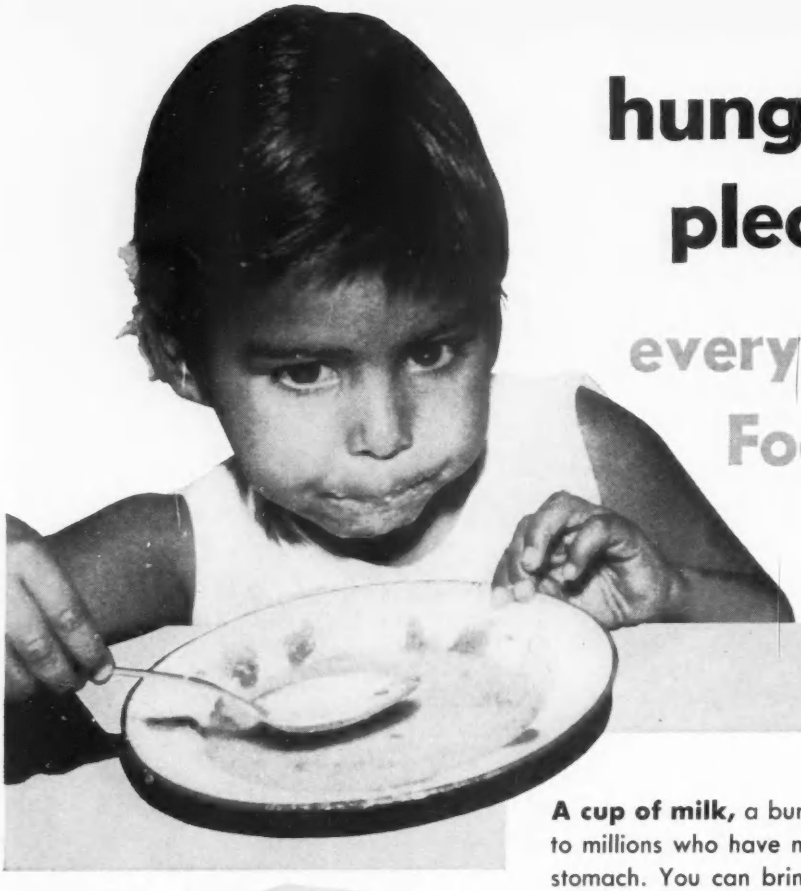

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(Continued from page 38)

As for the political heat the question of satellite communication has developed, I believe there have been wide misunderstandings.

In the first place, the circuits for international communication that could be provided by orbiting satellites are not something brand new but only an extension of essentially the same kind of circuits now provided by radio and underwater transmission facilities. In fact, they would be almost exactly the same as those provided by the common carrier-owned microwave systems so prevalent in this country.

They would be a supplement to circuit facilities now used for international communications. For this reason alone, they should reasonably be subject to the same kind of operation and control as the remainder of the system.

There has been much discussion as to whether this country's government regulatory processes, primarily the Federal Communications Commission, could cope with questions and problems that might develop from space communication. As far as regulation of communication by satellite is concerned, I cannot see that space circuits would add a single regulatory problem from those faced and handled in the past.

There is nothing new in the international aspect of such communication. United States telephone users can reach 158 different countries around the globe right now. There has been no friction between this country's privately-owned communications companies and the foreign governments with whom they have worked in building and operating the international communications network.

No Trouble in Negotiating Contracts

PRIVATE COMMUNICATIONS companies in this country have found no trouble in negotiating contracts with private companies in foreign countries and with government-owned and operated systems. The long-standing and growing system of underwater telephone cables, usually jointly owned by American companies and foreign agencies or governments, is an excellent illustration of this kind of joint venture.

The American Telephone and Telegraph Company now has 70 contracts with communications companies or government agencies in 165 countries throughout the world. There have been no serious problems evident in arriving at how these facilities would be built, owned, or operated, nor how revenues would be divided.

These contracts have stood the test of good times and bad, of war years and peace. I am confident the communications companies would continue the same performance in arranging for the operation of the satellite system.

Much of the furor as to who should own and operate a satellite communication system has grown out of what might be called the unknown or dramatic aspects

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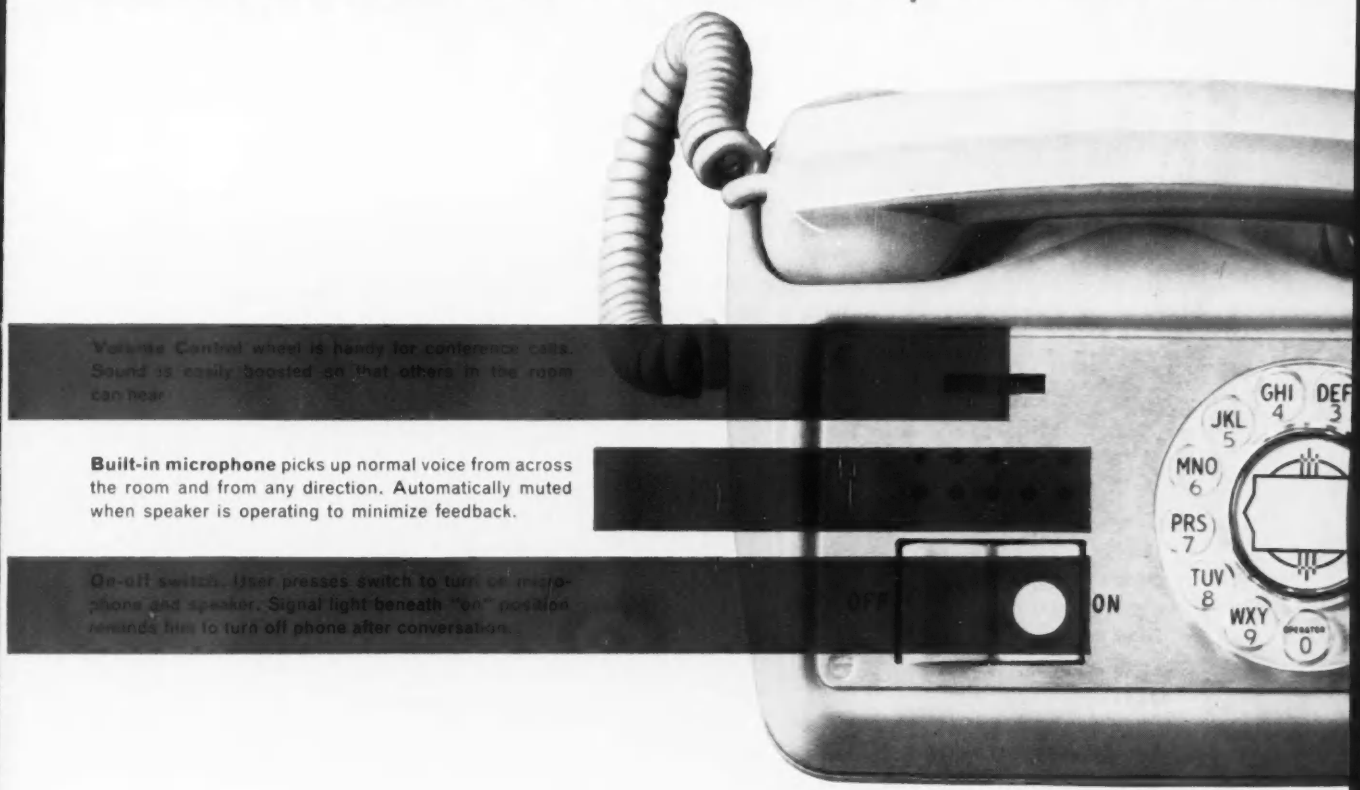

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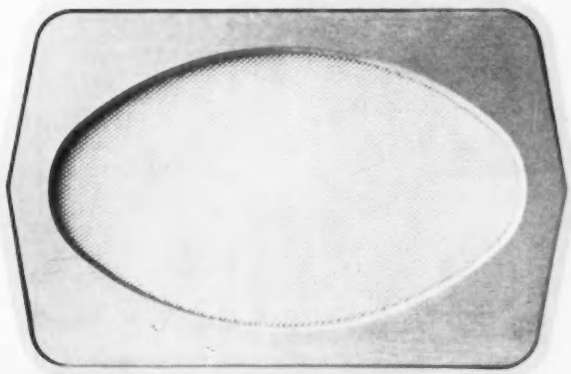

of space which is still a mystery.

To most people, space somehow carries a connotation of danger. But this impression is rapidly changing. Spacecraft, space travel, space stations undoubtedly will become reasonably commonplace in the next decade or so.

With this understanding, the use of satellites for communication purposes becomes one of the most obviously good and peaceful uses for space. I hope private industry in this country will be permitted to take the lead in building a space communication system and getting it into operation immediately.

They have made a good start with the Echo project. If given the opportunity, I am sure they will bring credit to this country and reflect what free and democratic people can accomplish through private enterprise in the peaceful development of a vital world service.

Ability to Complete Big Assignments

ONE REASON for my belief that this country's private enterprise can and should play a major part in building a system of international space communications is that the privately-owned communications industry has proven its ability to carry out big and vital building assignments.

Time and again they have been given big and almost impossible difficult defense tasks and have completed them on time or ahead of time. I believe strongly the net cost to American taxpayers under this arrangement has been less than under any other procedure and the performance better.

The ideological battle between this country and communism involves among other things the argument over whether the capitalist system of private enterprise or the communist system of state ownership is best. Here is a once-in-a-million opportunity to demonstrate to the world that the capitalist system is superior.

The federal government cannot do everything and be everything. It has its hands full. This fiscal year the federal government will overspend its $81 billion budget by $6 to $8 billion.

These are strong, practical reasons for placing in the hands of private enterprise every service which can possibly be done as efficiently or more efficiently than if it were done by government.

At the annual convention of the National Association of Railroad and Utilities Commissioners, I sponsored a resolution which said in part, "the association . . . does hereby express its conviction that the common carrier industry should be encouraged to provide satellite communications in the traditional American way, under regulation, without government subsidy, that provision by the carriers will result in the earliest possible realization of a compatible working system and will best demonstrate to the entire world the vitality of the free enterprise situation — "

This resolution was adopted unanimously by the convention. Regulatory people believe this arrangement will produce the best international communications and will best serve the interest of all Americans in the worldwide struggle of free societies against the communist threat.

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Several extension phones were placed on other floating docks to operate off the Marina's PBX board.

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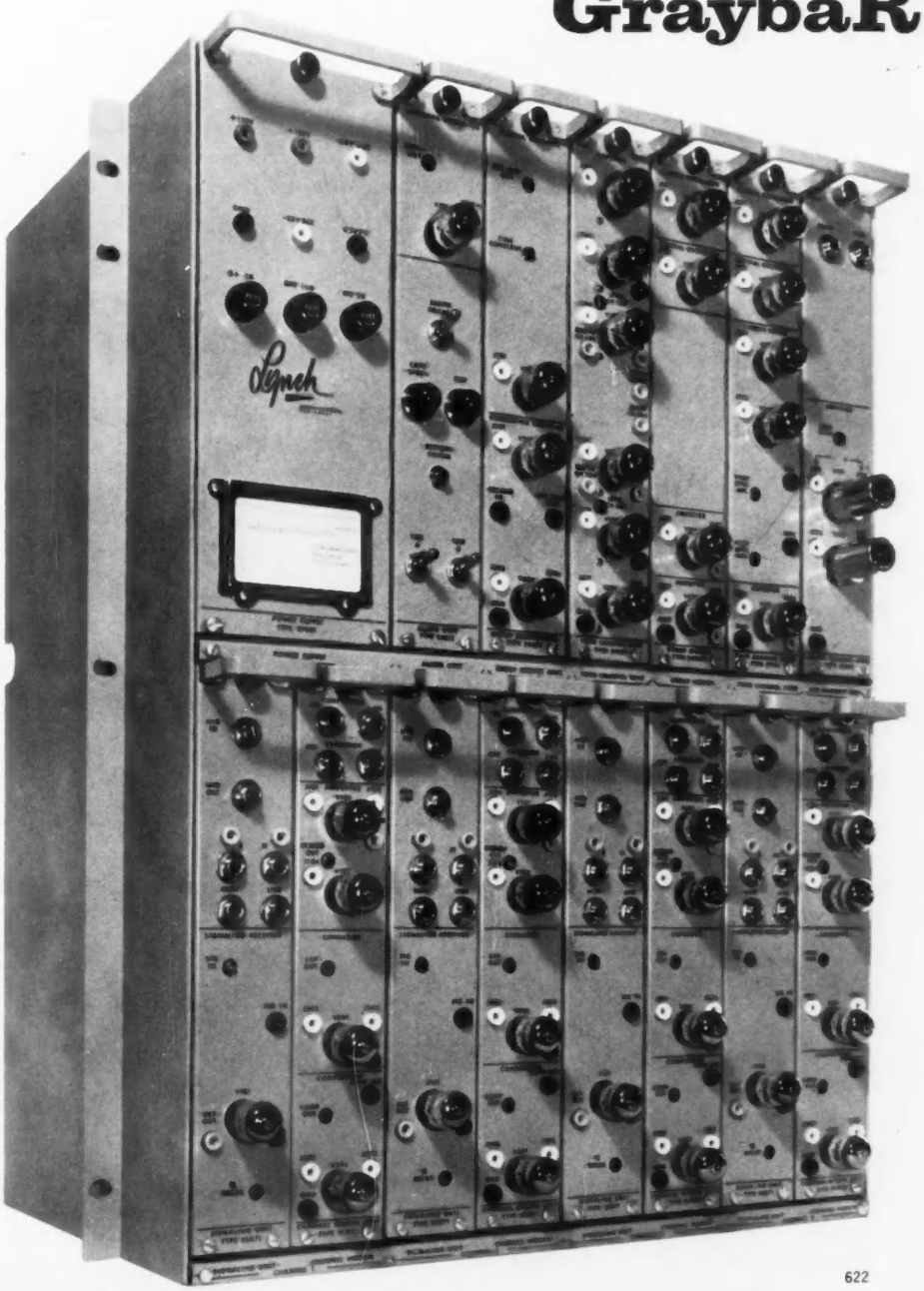

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2

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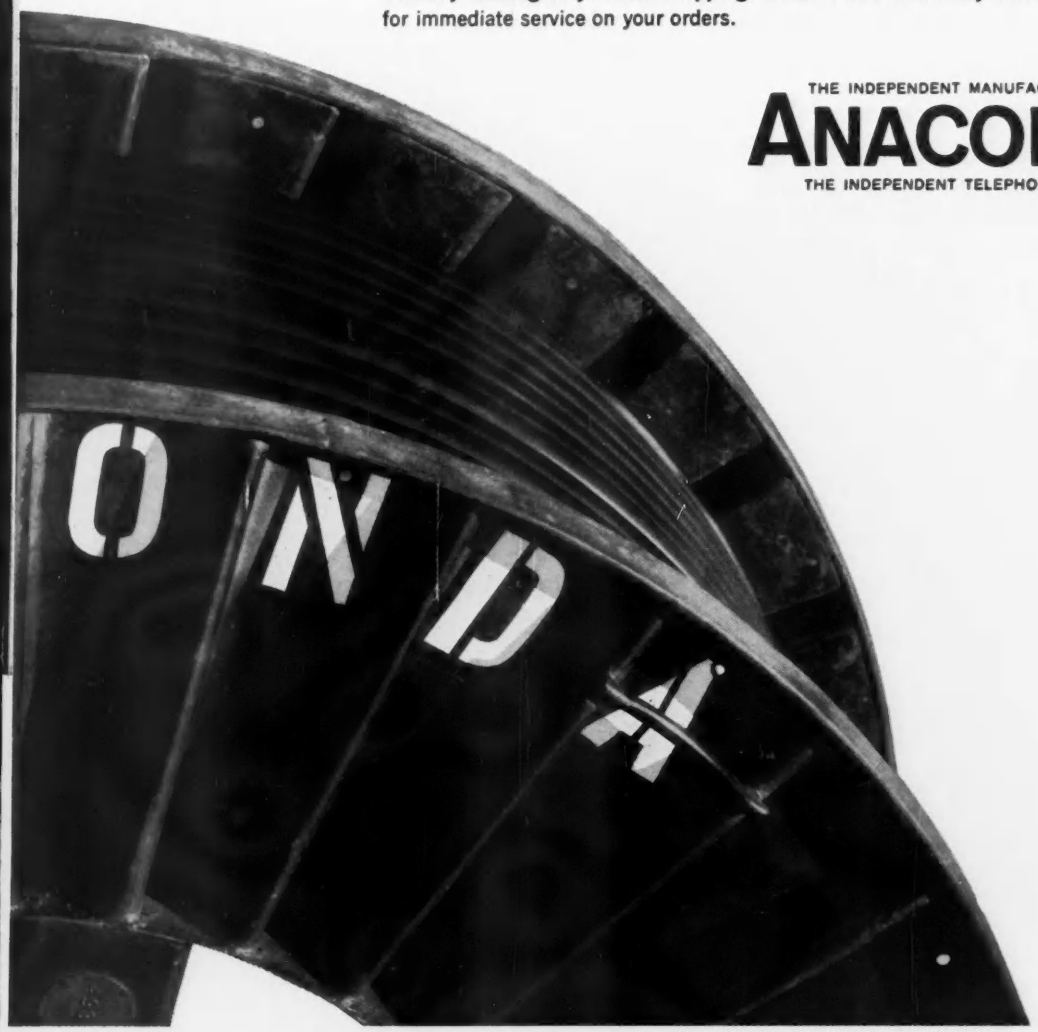

THE INDEPENDENT MANUFACTURER FOR
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ROY B. ARNOLD (left), Mountain States Tel. and Tel. Co., Boise, Idaho, confers with DICK BAKER, secretary of the Rocky Mountain Telephone Association, Coeur d'Alene.

Attending the Rocky Mountain Telephone Association Fifteenth Annual Convention in Boise, Idaho, were (l to r): CLIFFORD PEARCE, former president of USITA; DONALD DICKSON, retired president of Rocky Mountain Telephone Association; DON BASLER, director, Western Area Telephone, REA, Washington, D. C.; and D. G. ROWLES, Gem State Tel. Co., McCall, Idaho.

Customer-Consciousness Key to Future, Morris Tells Rocky Mt. Assoc. Convention

"ANY SUCCESSFUL business was at one time a small transgressor into a fertile field of market demand, filling a need not fully or adequately met by a competitor. To remain on top is not to be complacent and provide what is convenient to provide. This may make for survival — but any skid row bum can survive," said R. V. Morris, Idaho vice president and general manager of Mountain States Telephone and Telegraph Company before the Rocky Mountain Telephone Association convention in Boise, Idaho.

"Survival is not good enough," Morris continued. "If the telephone industry is to grow and prosper, it is evident that it has to become communications conscious. And in communications we have no monopolies, no license that gives any advantage whatsoever over outsiders. In fact, the word 'outsiders' in this context is anachronistic, as today the arts of communication and the means of implementing communication services are common to many.

"There are lots of boys eager to carry the message. They can do so just as readily and competently as the telephone companies. Such well-known names as G. E., Motorola, RCA, Western Union, and many others are as closely associated with communications as the names of telephone companies.

"To become communication oriented it is necessary to become a marketing organization, because marketing is customer-mindedness on the part of the entire organization. A company-conscious organization is under the impression the customer exists for the company. The customer buys the product or service the company offers, and hence makes it possible to produce more of the company's product."

A customer-conscious organization — a company using the marketing approach — integrates all of the components into a unified effort with one objective — that business exists for the customer, Morris pointed out. It is not easy to do because marketing is a state of mind oriented to the requirements of the market place. It is essential that all echelons in the company have the same state of mind.

This trio of Rocky Mountain Telephone Association convention-goers are (l to r): DONALD DICKSON, retired president of the association; WALTER E. CARROLL and GEORGE DeHOFF, speakers at the convention.

Change Not Easy

IT IS NOT merely lip service but dedication, he said. What makes it more difficult to achieve is that it requires a change in thinking, and change is not easy, particularly in a naturally conservative organization such as the telephone organization. Marketing demands a competitive spirit from all employes. None can go along for the ride if success is to be achieved.

"When we talk of marketing, we must remember accounting and billing are an integral part of this organization," Morris said, "and should not be overlooked when providing service from the customer's viewpoint. We cannot meet competition by bending customers to meet our billing objectives. Most users recognize the requirement for standardization, particularly with the advent of automation.

"They are faced with a similar

problem. Exceptions are sometimes warranted and we should lend an understanding ear to customer billing complaints and be as flexible as possible. The very least we can offer is a pleasant, courteous, prompt, and accurate reply to a customer's question on a billing matter. A toll query properly handled can set the stage for an extension or color sale."

Other speakers at the convention were: Don E. Basler, director, Western Area Telephone, REA, Washington, D. C., on "REA Telephone Reports from Washington"; W. E. Carroll, vice president — operations, General Telephone of the Northwest, Spokane, Wash., on "Human Relations in the Telephone Industry"; Clifford C. Pearce, president and general manager, Farmers Telephone Co., Riceville, Iowa, on "Frontiers in Communications"; G. W. DeHoff, president, Magic Valley Christian College, Albion, Idaho, on "What Made America Great?"

The convention also featured a forum on transmission: "What Transmission Requirements Do We Need to Meet on Both Local and Long Distance for DDD Now and in the Future?" Moderators were R. G. Baker, Idaho toll plant supervisor, and R. E. Bailey, Idaho transmission and protection engineer.

REA Appraisal Made

DON BASLER, remarking about REA activities, said:

"Shortly after assuming responsibility for the REA programs, Administrator Clapp called for a rather sweeping appraisal of the current status of the telephone program. It was done in part to see where we stood and in part as a result of criticisms he had received. This appraisal has taken some time and considerable effort.

"One of the conclusions he reached as a result of this appraisal was that we needed an overhaul of our loan security policy. This was done and the new policy was announced in June.

"It has two primary points of interest both to current borrowers needing additional loans and to new loan applicants. One is the requirement that borrowers having remote ownership and control must provide a specialized minimum level of net worth initially as security for the loan. The previous requirement of a continuing minimum level of net worth as a prerequisite to the declaration of dividends remains in effect. The new initial net worth requirement will apply to new borrowers that have remote ownership and control. It will also apply to new loans to existing borrowers with the same type of ownership situation where the loan is for system expansion.

"Are We Competitive?" asks ROBERT MORRIS, vice president and general manager of Idaho Mountain States Telephone and Telegraph Co., Boise, Idaho.

"Generally, we will not require existing borrowers to increase the net worth related to loans already approved as a condition of obtaining additional loans," Basler said. "Nor will we require additional equity for loans required to improve or extend service within service areas already established through prior REA loans."

Normally, Basler indicated, this initial net worth requirement will not affect the cooperative or the locally owned and controlled commercial company.

The second primary requirement relates to acquisitions of existing facilities as the basis for REA loans. There has been criticism, Basler said, that prices of proposed acquisitions were excessive in some instances. Excessive acquisition prices pose two problems:

One, they tend to increase the cost of service to the subscriber; and two, they tend to perpetuate themselves by increasing the general level of prices of succeeding acquisitions. Both of these characteristics handicap the orderly development of rural telephony, Basler pointed out.

Analyze Borrowers' Systems

ONE FINAL development that Basler said would be of interest was that each year in Washington the REA prepares an analysis of the operations of its borrowers' systems. The REA had just completed analysis of 1960 operations at the time of Basler's address.

For all borrowers in the nation as a whole, the median revenue received per subscriber — local service, toll and miscellaneous — is about $78 per year, or $6.50 per month, Basler said. One-half of REA's borrowers received more than that and one-half less, he indicated.

And of that amount, the net income or margin retained by the median system was $4.28 per year per subscriber o r35 cents per month. In the mountain area the results were more striking by comparison, Basler said. Total revenue received by the median system was $108 per subscriber per year or $9 per month. Net income — the median system retained just 81 cents or about 7 cents per subscriber per month.

"This is indicative of the problems you telephone people face out in this big country," he said. "Your subscribers are far apart — your construction and maintenance problems many — the need for real management ingenuity is great in meeting the demands of a rural community that wants and needs adequate telephone service. To the extent that REA can, we stand ready to help you, with financing, with engineering skills, with management assistance.

"You are doing today things that were not considered possible 10 years ago. There is no telling what you will be able to do tomorrow. But it means real concern over the fine points — keeping initial construction costs down where possible — making use of the best management

talents you have to keep the operating costs within reason — taking advantage of anything that will help you reach out a bit farther to bring service to that distant subscriber.

"This is a rewarding business, this business of providing the lifeline of communications to a growing country — rewarding in the sense of a job well done, if not always in monetary returns. We in Washington are happy to play a part in the dynamic growing industry that you represent."

Walter E. Carroll, commenting on human relations in the telephone industry, said: "Although human relationships have existed since the beginning of human life, the art of scientifically trying to deal with them at work is relatively new.

"The term 'human relations' was used in business very little before 1940. The Age of Human Relations is the latest of several developmental stages in American industry. As labor unions expanded, they created new human relations problems and emphasized old ones. Some managers perceived the rise of unionism as a confirmation of their own failure to develop human relations in their firms, and they set out immediately to right their human relations wrongs.

Workers Seek Improvements

"THE WORKER himself demanded improved human relations. Better education enabled him to see business problems, to challenge management, and to demand better leadership. Increased size has created many new problems. Greater specialization in business has created new human problems. Each organizational unit or employe works on a smaller part of the whole product and thereby loses his sense of accomplishment."

Increased labor costs have encouraged management to make full use of labor (by eliminating as many inefficiencies as possible), Carroll stressed. One way to accomplish this is by better human relations, he said.

Finally, the high standard of living in modern society permits emphasis on human relations, he pointed out, citing the reasons given in previous paragraphs to show that the age of human relations is a natural result of trends that have been developing over a long period. It may eventually be replaced by a new historical period as new problems and trends develop, Carroll indicated.

DONALD DICKSON, retired president of the association, makes a few farewell remarks prior to handing the gavel of the presidency to E. P. Corbin, incoming president.

However, the subject should always be significant because it concerns the great variable in organizations — people. What is the full meaning of this important subject? Human relations is the integration of people into a work situation in a way that invites them to work together cooperatively, productively, and economically.

"It is often said that there are three M's in management — materials, money, and men," Carroll said. "Our management may be regarded as involving the management of production, of finance and of manpower. Actually, most management is manpower management.

"For the sales manager, the production manager, or the finance manager does not, in most cases, actually deal with or perform the consummation of sales, the routing and standard setting of production, or the handling of detailed financial accounts. Rather, each directs a force of employes who perform these functions. They manage men, while the latter do the actual work. Management is essentially getting things done through the efforts of other people.

"The manager, foreman, supervisor, department head, vice president or president who fully understands the direct relationship between human values and his job is more often than not a superior manager because of that understanding. He is careful to see that his people know what they are to do and how to do it; thus they participate in his thinking and decisions and there is a common understanding of basic objectives.

"He motivates them to do more for him than they would for anyone else, and he is constantly seeking out ways to help them do even better. He knows that human relations is the whole book — the beginning and the end of the management job."

Widened Interest in People

CARROLL POINTED OUT that, if there has been improvement in management over the years, then this improvement rests upon mangement's broadening interest in people. True, he said, improvements in specific methods and techniques have consistently been achieved, but only in pace with the growth in management's appreciation of the true value of people. Advances have been made on these two fronts, but who will deny that the more creative of these remains the human challenge.

Managers of men should remember that they are directing men and not machines, Carroll said. The occasional friendly word of judicious praise often gives a spur to more effective work. It is vital for those in positions of responsibility to be patient despite trying conditions. Above all, they must be fair.

No matter how restricted it may be, they should try to appreciate the other person's point of view, and they should make every effort to hold their tempers no matter to what extent they may be irritated. They must avoid saying things that never should have been said, at least never said in the heat of anger. Quietness and thoughtfulness in speech and action should be studiously striven for by them.

Their horizons are wider than the usual horizon, their outlook broader

than the average outlook, and therefore it is fair to expect self-restraint and impartiality from them, Carroll said. To hear patiently what their subordinates have to say, and to convince these subordinates that they want to be fair and just, should be among the first lessons learned by all in positions of authority. Someone has said that the greatest of human inventions is the conference table.

"Despite the urgency and importance of human relations, any good thing can be overdone, so a word of warning is in order," Carroll said. "Any idea can be misapplied by unskilled persons, but even worse is for experts in a subject to take it too seriously and overdo it.

"Those who apply good human relations should remember that its goal is to balance human and technical values, rather than replace all technical values with human values. As happened with scientific management decades ago, good human relations can be misapplied by unskilled or overeager managers.

"It appears that human relations will receive, in fact will require, increasing attention from businessmen. Though it has been a part of business from the beginning, it is now historically at a stage which promises greatly expanded emphasis," Carroll said. "In a sense business has a new cause to champion. It has successively championed the finance, production, distribution and research sides of business, and has found that these ideas paid off."

"They have paid off in an economic sense of providing more goods and profits, and in most cases they have been socially desirable, too. Effective human relations offers the same kind of remarkable results," Carroll said.

New Officers, Directors

OFFICERS elected for this year are: President, E. P. Corbin, Midland Telephone Co., Monticello, Utah; vice president, Victor Redman, Pagosa Springs Telephone Co., Pagosa Springs, Colo.; secretary-treasurer, J. W. Baker, Coeur d'Alene, Idaho.

Directors chosen include: J. W. Baker, Coeur d'Alene, Idaho; C. A. Blakeney, General Telephone Co. of the Southwest, Carlsbad, N. M.; Ward Blazzard, Kamas-Woodland Telephone Co., Kamas, Utah; Rulon Callister, Millard Co. Tel. and Tel. Co., Delta, Utah; E. P. Corbin, Midland Telephone Co., Monticello, Utah; Earle Crandall, Wyoming Telephone Co., Pinedale, Wy.; Donald Dickson, Project Mutual Telephone Co., Rupert, Idaho; C. W. Haas, Big Timber Home Telephone Co., Big Timber, Mont.; C. M. Hart, Citizens Utilities Co., Kingman, Ariz.; L. J. Hitchens, Ruidoso Telephone Co., Ruidoso, N. M.; E. J. Jennings, Western States Telephone Co. Inc., Holbrook, Ariz.; Charles McLean, Pacific Power & Light Co. Kalispell, Mont.; D. A. McLean, The Mountain States Tel. & Tel. Co., Denver, Colo.; H. B. Norman, Gunnison Telephone Co., Gunnison, Utah; Victor Redman, Pagosa Springs Telephone Co., Pagosa Springs, Colo.; Floyd L. Reyher, Haxtun Telephone Co., Haxtun, Colo.; and Grid Rowles, Gem State Telephone Co., McCall, Idaho.

The executive committee is: E. P. Corbin, Donald Dickson, Victor Redman, D. A. McLean, and J. W. Baker.

Georgia Population Increases Challenge Independents, Pilcher Reminds Convention

THE 39th ANNUAL convention of the Georgia Telephone Association took place at Jekyll Island, Georgia.

Main speakers at the meeting were: the Honorable Crawford Pilcher, chairman of the Georgia Public Service Commission; Harold F. Clark, area director of Southeast Area Telephones, REA (for Richard A. Dell, deputy administrator, REA); H. M. Stewart, a director of USITA; J. H. Wright, General Telephone Company; S. Bennett Wynne, general marketing manager, Southern Bell Tel. and Tel. Company; and J. P. Gleaton, then president of the GTA.

"The telephone industry is a good barometer to measure the growth of any area," Pilcher said. "In 1950 Georgia's population was 3,445,000. In the 1960 census the state's population rose to 3,924,500. This is an increase of 14 per cent for the 10-year period.

"During the 10 years of the 1960's the population is expected to increase by 15 per cent so that in 1970 we expect to have about 4,500,000 people in Georgia. I don't need to tell you that this increase in population will mean more demands for your services.

"Central offices which probably seem adequate now will have to be enlarged. Additional cables and wire will be required to meet new demands. In short, continuing strain will be put on telephone plant to keep pace with the future.

JAMES H. WRIGHT, safety director, from Durham, N. C. and with General Telephone Co. of the Southeast, presented a safety lecture and demonstration, illustrated.

"In the 10-year period of the 1950's the percentage of families in Georgia with telephones rose from 38 per cent to more than 63 per cent," Pilcher continued. "By 1970 it is expected the percentage of families with telephone service will increase to 79 per cent.

"The total telephones in Georgia increased from 538,150 in 1950 to 1,158,689 in 1960. While this

growth for the state as a whole was some 100 per cent, the increase in the areas served by the Independent companies was more than 170 per cent.

Companies Decrease, Exchanges Increase

"FURTHER evidence of the growth by the Independent companies is shown by these figures. While the number of companies decreased from 99 to 60 in the 10 years, the total number of exchanges served increased from 172 to 216.

"The number of dial exchanges grew from 49 in 1950 to 210 by 1960 which means that some 97 per cent of the Independent exchanges were dial," Pilcher said.

"Regardless of what means we take to meet the challenges of the future, you can never lose sight of the fact that your customers will still be people. You may serve them with fantastic machines and undreamed of gadgetry, but your customers will always be people.

"They will respond favorably to service that meets their needs — a service that is warm and friendly and concerned with their telephone problems."

In presenting the address for Mr. Dell, who was unable to attend the convention, Mr. Clark said: "You can expect REA to emphasize area-wide coverage more than before. This is a *must* on our agenda. As you will recall, the Act under which we operate requires that loans shall bring telephone service to the widest practicable number of people in rural areas.

"I have to tell you quite frankly, that REA is more interested in people than in profits. As Administrator Clapp said shortly after taking office, REA stands in the same corner as the subscriber and the potential subscriber.

"Our responsibility is to help make it possible for you to serve more rural people and to serve them better. All of our policies, all of our procedures, all of our activities are directed to this one goal.

"In the drive to achieve area coverage, we have come into the critical stage. It was relatively easy to extend service around the edges of towns and along the highways. To get the rest of America on the telephone line is not going to be easy.

HAROLD F. CLARK, area director, Southeast Area Telephones, R.E.A., addressed the convention on what to expect from R.E.A.

H. M. STEWART, president and general manager of Standard Telephone Co., Cornelia, Ga., brought greetings from USITA.

REA Surveys 180 Borrowers

"IN ORDER TO FIND out how good a job REA borrowers have been doing in reaching people out beyond the base rate area, we recently surveyed 180 telephone borrowers in five states. This was part of REA's reappraisal of its entire telephone program, ordered by Mr. Clapp shortly after he became administrator.

"Results of the survey indicated that many REA borrowers still have a large job of area coverage to do within their present service territories. Telephone organizations answering the survey questionnaires reported that more than half of the total number of establishments outside the base rate area still are without telephones.

"This area coverage study showed that in the surveyed systems almost two-thirds of the unserved establishments outside the base rate area are located adjacent to existing lines. These could be connected at a relatively low cost and without delay. Their addition to the number already served would result in substantial improvement in operating revenues. This kind of improvement might be welcome to all REA telephone borrowers.

"Here in Georgia, we have completed a study of census data which demonstrates the proportions of the area coverage job still untouched. The tabulation reveals that in each of 38 counties in Georgia there are from 500 to 1,000 farms without telephones of any sort. And in each of three additional counties there are from 1,000 to 2,000 farms without service.

"Granting that some considerable number of these cannot presently afford telephones, they are balanced out by many non-farm homes, stores, and other establishments in these same counties which *can* afford telephones — if the service were available.

"Here is a market potential for telephone service in the state of Georgia that is not being developed. Here are the people REA is talking about when we point to our area coverage goal. Who will provide telephones in these unserved areas?

"Many of the unserved households in your territory probably do not feel they can afford service at any price. Some people who have been without telephones may find it easy to rationalize their ability to continue without service. Others would become subscribers if the full value of the service was explained to them.

The ingredient that apparently is needed is an active sales promotion program. It is not enough to wait for people to ask for service — Go sign them up.

"The telephone industry competes with others for the consumer's dollar. You offer a service that is essential to our American standard of living, but for those families who are not familiar with its benefits, educational sales promotion will have to be stepped up.

Names of new GTA officers elected for 1961-62 are: President, Jim Evitt, Jr., Ringgold Telephone Company, Ringgold, Ga.; first vice president, Madison New, Thomaston Tel. Co., Thomaston, Ga.; second vice president, Cam Lanier, Jr., Interstate Tel. Co., West Point, Ga.; secretary-treasurer, E. R. Britt, Pineland Tel. Coop. Inc., Metter, Ga.

GTA directors for 1961-62 are: Cam Lanier, Jr., West Point, Ga.; Glenn Bryant, Hinesville, Ga.; Joe Dyson, Washington, Ga.; R. L. Lineberger, Gray, Ga.; H. M. Stewart, Cornelia, Ga.; Jim Evitt, Jr., Ringgold, Ga.; Downing Musgrove, Homerville, Ga.; A. L. Boyer, Atlanta, Ga.; C. J. Mathews, Statesboro, Ga.; W. C. Deloach, Blakely, Ga.; Aubrey E. Sikes, Glennville, Ga.; Ernie Kirk, Dalton, Ga.; Madison New, Thomaston, Ga.; John Cozart, Fitzgerald, Ga.; Arthur Fincher, Canton, Ga.

Van Horn Urges Political Education of Employes at Michigan Assoc. Convention

THE MICHIGAN Independent Telephone Association, meeting in its 26th annual convention at Grand Rapids, asked itself: "Are You A-OK for '62?"

Keynoting the general session was Joseph L. Van Horn, president of the General Telephone Companies of Iowa, Missouri and Nebraska and mayor of Grinnell, Iowa.

Speaking on "You're in Politics Whether You Like It or Not," Van Horn pointed out that the business community has too long held itself aloof from politics to the disadvantage of those whose responsibility it is to create a healthy economic and industrial climate.

"A favorable legislative climate is the key to healthy businesses," he said. "We take the position that all people in every area are anxious to see that a favorable legislative climate is maintained as an aid in keeping local business healthy. *Favorable* does not suggest special privileges, but a climate where the needs of the business community are fully considered with the needs of the overall community."

An effective job of communicating business problems and requirements for "staying healthy" needs to be accomplished with governmental bodies at the state and local level, according to Van Horn. He urged the business delegation to:

1. Encourage employes to vote, without reference to political parties or candidates.

2. Discuss political issues in employe publications.

3. Testify through corporation officials on pending legislation. Let legislators know either in writing or by personal calls how business feels about specific issues.

4. Discuss in institutional advertising political candidacies, economic issues having a political impact, or other subjects suspected of having political overtones.

5. Educate employes on political and economic issues through management publications, films, discussion programs, and in many ways.

6. Encourage managerial and supervisory personnel to learn and engage in practical politics.

7. Keep close contact with local officials, legislators and others empowered to make decisions affecting the corporation's welfare. Keep informed on community issues and problems. Keep officials informed of the business viewpoint.

President of Michigan Independents, JOHN COLLVER of the Climax Telephone Co., speaks to largest gathering in history of association at 26th annual convention.

The Honorable James Inglis, chairman of the Michigan Public Service Commission, related reactions he has experienced in providing responsible leadership for the regulatory body whose aims parallel so closely those of the Independents.

He said, "Even now after such a short time, thinking philosophically about the relationship between the commission and the businesses with which it is concerned, and the public which those businesses serve, it seems to me that there is one common denomination which unites all of the activity of these three groups. That is to see that the customer gets the best possible service at the lowest possible price consistent with an economic safety.

"To accomplish this, it is obvious that the three — the public, the utility and the commission — must cooperate in a spirit of teamwork. I have found this to be true and look forward to a long period of cooperation and teamwork.

"Perhaps you are interested in some of the things that I have seen and learned since I have been chairman of the Public Service Commission. One of the things that has impressed me most is the tremendous job being done by the Independent telephone industry in Michigan.

"Most people outside the telephone industry have little understanding or recognition of the increasingly im-

portant part that 93 Michigan Independent telephone companies which your association represents are playing in the development of communications to our state.

"Our telephone staff tells me the Independent exchanges in Michigan are growing at a rate of about 6 per cent per year as compared with a growth of about 3 per cent per year for Michigan Bell Telephone Company.

"The excellent job being done by your Independent telephone companies is primarily due to the excellent management provided by those of you gathered at this convention. I have been impressed by the desire of most Independent telephone people to do a good job in providing telephone service to the areas in which they operate.

"The Independent industry has generally put its house in order and individually and collectively are ready to meet the challenges that lie in the future. From what I can hear from members of the commission's staff who have been around for some time, the Independent industry now, more than ever, is standing on its own two feet. It is making its own decisions and is helping to shape its own destiny and is forward looking."

1961-62 Board of Directors of Michigan Independent Telephone Association are, seated (l. to r.): R. J. DAVERMAN, Calhoun Telephone Co., first vice president; JOHN COLLVER, Climax Telephone Co. president; L. W. REYNOLDS, SR., Ontonagan Telephone Co. vice president; K. W. BENCKERT, General of Michigan, treasurer. Directors, standing (l. to r.): K. B. SAGE, Traverse Bay; ED CADWELL, Levering; D. K. CARLSON, Morenci; ART NICKLESS, Millington; AL SPRY, Howard City; D. M. DAVIS, Bridgman; GLEN WATTERSON, Brooklyn. Davis and Watterson are new directors-elect. (Missing from picture is John Fox, Waldron).

Promote Understanding

INGLIS SAID he understood the association had done much, particularly through regional and other local meetings, to promote a better understanding among the Independent operators and to help increase their knowledge of their business. In addition, there appeared to be excellent cooperation among all companies, Bell and Independent, engaged in providing telephone service, in Michigan so good service at fair rates could be provided under equitable arrangements for sharing costs.

Inglis added, "Since at one time I was a newspaper man, it is only natural that I am interested in the trade magazines published for the Independent industry. I have been much impressed by the wealth of information and down-to-earth discussions available in the two magazines that serve the Independent industry. I am sure that many of you sitting here today have kept up to date with events affecting your business and have gained much knowledge and know-how from these trade papers."

The speaker concluded: "Let me say that we welcome the opportunity to work with you as advisors and consultants in reaching solutions to those problems and assuring the continuing rate of progress. And let me congratulate this association on its leadership. I am told the Michigan Independent Telephone Association is one of the stronger and best supported of the state associations. Cer-

Shown (l. to r.) enjoying tea at Michigan convention are: MRS. RUTH DAVIS, Bridgman, co-chairman of women's events; MRS. K. B. SAGE, Central Lake, wife of retiring president; MRS. TAYLOR, Pickford; MRS. CUSINO, New Port; MRS. SMITH, Newport; MRS. SATTLER, Leelanau; MRS. DILLIANGHAM, Beaver Island.

tainly this is consistent with the spirit of cooperation."

A discussion of "New Developments in Outside Plant" by Charles Ballard of the REA Standards Division proved challenging, as did the speech of Hon. Donovan Rau, deputy commissioner of the Michigan Department of Revenue. Rau pointed out that new taxes are a necessity and that there was little question that the "nuisance tax" on telephone services in effect for 18 months was certain to be one of the taxes considered as the legislature seeks added sources of revenue.

A discussion of 1961 Wage and Hour Law amendments was headed by Ward F. Parks of the US Department of Labor.

C. C. Pearce, former president of USITA speaking on "Frontiers in Communications," challenged his listeners to meet the demands of the days ahead. He reviewed the year's accomplishments and gave a preview of what is ahead for Independents trying to keep pace with the ever-growing demand in the communications field.

The role of the communications industry in the fast developing area of education was presented by Franklin G. Bouwsma, director of the community of Delta College which will serve a tri-county area of Michigan.

HON. JAMES INGLIS, Lansing, chairman of Michigan Public Service Commission, speaking at Michigan convention.

Reminiscing during Michigan's convention are (l. to r.): MRS. JANE McNALLY, first secretary of the Michigan Independent Association; and FRED HARRIS, founder of Harris-McBurney Co. He was first chief engineer of the Michigan Public Service Commission. Mrs. McNally was the regulatory body's first secretary.

The speaker detailed factors that make for rapid development in this new field of instruction and urged participation in the development where telephone facilities are essential to the healthy progress of TV educational programs.

Report from NORAD

A BELL-developed program "Communications and National Defense" was highlighted by a direct-line report from NORAD headquarters in Colorado Springs, permitting the audience to ask questions of the officer in charge.

The convention honored R. J. Schafer, Pinconning, on his retirement from the board of directors of the Michigan association. Schafer will continue as a director of USITA.

New president of the association is John Collver of the Climax Telephone Company. He is the first president elected whose exchange has fewer than 1,000 subscribers.

Other officers chosen by the directors were: Vice president, R. J. Daverman, president of the Calhoun Telephone Co.; Upper Peninsula vice president, L. W. Reynolds, Sr., president of the Ontonagon Telephone Co.; treasurer, K. W. Benckert, operating vice president of General of Michigan. The board named Charles McLellan, association secretary, of Lansing, executive vice president.

Named to the board of directors are D. M. Davis, president of the Citizens Telephone Company of Bridgman, and Glenn Watterson, vice president of the Southern Telephone Co. Davis was director of the Nebraska Telephone Association and a director of USITA before acquiring the Michigan company. Watterson is one of the youngest men ever elected to the board. They replace retiring directors R. J. Schafer, president of the Pinconning Telephone Co., and John Sattler, president of Leelanau Telephone Co. and only living charter member of the association.

A. H. Nickless, vice president of the Wolverine Telephone Co., and L. W. Reynolds, president of the Ontonagon Telephone Co., were re-elected to directorships.

During the banquet recognition was given Mrs. Jane McNally, who served the association at its founding and was first secretary of the Michigan Public Service Commission.

Two resolutions — one of condolence to the family of John Maser, long-time president of AuGres Telephone Co. who died during the year, and one of commendation to the Toll Settlement Committees of USITA — were passed unanimously.

K. B. Sage, retiring president, said: "You know that your association early in the year entered into discussions and negotiation with the Bell company and the commission

Welcoming a crowd that set a new high for attendance at Michigan Independent Telephone Association conventions is ED CADWELL, president of Levering Telephone Co., who was general chairman of the 26th annual convention.

MARKER BUOYS indicate the path of a MILS submarine cable as it is pulled from the cable-laying ship. These are the cables that link MILS shore stations to outlying underwater networks of hydrophones.

AND MILS (MISSILE IMPACT LOCATING SYSTEM)

Listening, thousands of miles beyond the coasts of the United States, are the sensitive ears of MILS: the system that hears the ocean impact of missiles, satellites, and nose cones and determines their exact location.

Early in 1956, Western Electric and Bell Telephone Laboratories – because of their long and diverse experience in designing and building communications systems for the Bell System and the Government – were selected for the unusually difficult MILS project.

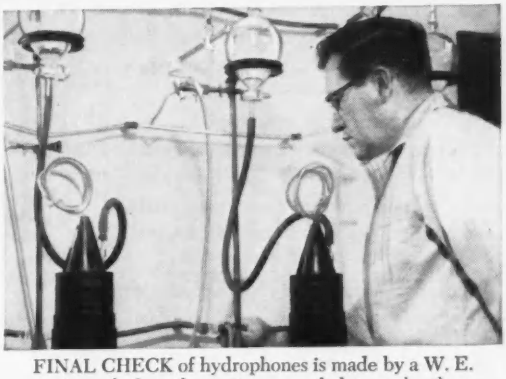
MILS is built around a number of strategically-placed hydrophones (underwater sound receivers), connected through range stations to a control center. The approximate area of a missile impact is determined by those hydrophones which hear the object hit the water. The exact point of impact is then calculated by electronic computers at Cape Canaveral, Florida, or Point Mugu, California – East and West Coast MILS headquarters – from the hydrophone information.

After the basic design of MILS had been developed by Bell Laboratories, Western Electric, as prime contractor, was called upon to apply its experience in submarine cable engineering, oceanography, hydrography and acoustical physics. Installation of the necessary cable and hydrophones was accomplished through the joint efforts of Western Electric's Military Engineering Service and the U. S. Navy.

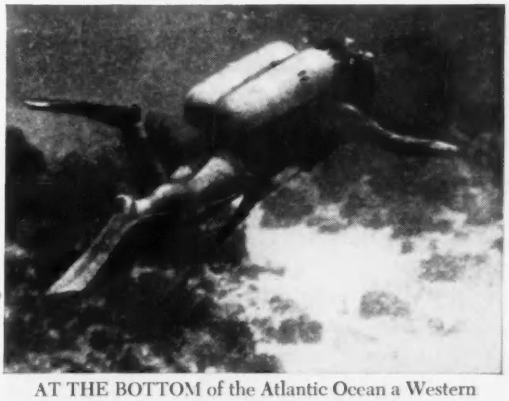
The success of MILS was possible only because of the coordinated efforts of the Navy, the Bell Telephone System, and hundreds of suppliers and subcontractors. Western Electric is proud to have been selected for this communications project – so vital to our nation's missile and space programs.

Western Electric

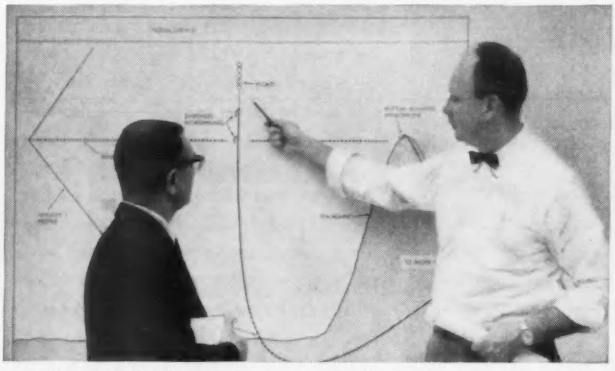
MANUFACTURING AND SUPPLY UNIT OF THE BELL SYSTEM



FINAL CHECK of hydrophones is made by a W. E. engineer before the units are sealed to make them air- and water-tight. These underwater "mikes" and other communications equipment were made for Project MILS at W. E.'s North Carolina Works.



AT THE BOTTOM of the Atlantic Ocean a Western Electric scuba diver swims across a trench, surveying a suitable spot to anchor a MILS submarine cable.



HYDROPHONES and the correct depths for these sensitive offshore sound receivers are the subjects being discussed by Bell Telephone Laboratories' underwater acoustics specialist, Sam A. Portaro, and William G. McDaniels, a Western Electric engineer.

RECOVERING HAM, a widely-traveled chimp (he went over 150 miles into outer space), is one of over 200 successful recoveries already achieved through the use of the Navy's W.E.-directed MILS.

on the WATS program. As the net result, all member companies are now participating in the WATS program.

Toll Settlement

YOUR STATE association in line with the USITA were responsible for a new Toll Settlement Agreement. The new agreement means an increase to all companies of about 7 per cent over and above what you had before.

"We have been instrumental in developing, with the accord of our Michigan Public Service Commission, a new foreign exchange tariff with results in restricting all FX to a toll basis."

The convention also took action on the development of a specific plan to use as a study basis for EAS. After the adoption of the state nuisance taxes, an agreement was made with the Revenue Department to permit exemption from much of the use tax payable by telephone companies.

The association has opposed such legislation as: The necessity of getting the approval of rate increases from the House of Representatives after commission approval, and the bill making the commission responsible for setting wage rates in the telephone industry.

The association actively supported such legislation as making for more severe penalties on breaking and entering coin boxes, and the fraudulent use of credit cards.

"Industry continued its 10-year growth pattern," Sage said, "with 338,831 in service at Jan. 1, 1961, as compared with 200,954 in 1952. Over 84 per cent of these are now dial; 33 per cent 10 years ago."

Homeowner Prefers Phone Instead of Electricity

IN THIS electronic age, when more American homes have TV sets than bathtubs, it's unusual to find a home that doesn't have electricity.

A representative of The Southwestern States Telephone Company found such a home in an area where Four States Telephone Co. — subsidiary of Southwestern States — was about to inaugurate a new telephone exchange. But the home wasn't without a link to modern communications. Its occupant had asked for telephone service on the new exchange.

This is the home of Mrs. Ida Bell Pirtle in Peach Orchard, Ark. Built in 1904, the house has recently been wired for modern dial telephone service but does not have electricity. Mrs. Pirtle said magneto telephone service was once available, but she has not had a telephone for more than 30 years.

Mrs. Ida Bell Pirtle, a resident of Peach Orchard, Ark., explained she felt telephone service was more important to her than electric service. She was anxiously awaiting the day when she could use her new telephone. Peach Orchard, in the agricultural area of northeast Arkansas, is served through a Delaplaine, Ark. exchange inaugurated September, 17.

Sole occupant of a large farm home, Mrs. Pirtle explained she sometimes becomes ill during the night. With the telephone she can call for assistance. She said she has no special need for electricity.

Mrs. Pirtle observed her 86th birthday anniversary on August 24. She has lived alone in her home since the death of her husband in 1945 and is enjoying good health.

Southwestern States officials said Mrs. Pirtle's home is the only residence in the company's operational area in Arkansas, Louisiana, Oklahoma, and Texas with a telephone but no electric service. Southwestern knows of no other such instance in its records.

Mrs. IDA BELL PIRTLE shown with the modern dial telephone installed in her large farm home. Mrs. Pirtle who was 86 years old the day after this photo was made, does not have electrictly in her home, but she feels that the telephone is far more essential to her than electricity.

Anchorage Council Favors Sale of Telephone System

MEMBERS of the Anchorage (Alaska) City Council, by vote of 7-1, went on record as favoring the sale of the municipally-owned telephone system if certain requirements are met. The council's stand was taken following earlier referendum rejection by the voters of a proposed $4 million revenue bond issue for telephone system improvements.

The council vote was on a motion by Councilman Harry Pursell that it "go on record as favoring the sale of the telephone system and request offers from all qualified prospective purchasers. At the same time I propose that we go on record in specifying certain requirements that will be necessary to consummate the sale."

He listed these as including: "A statement of what improvements to the system we could expect with private ownership; . . . assurance the sale would have no effect of imposing higher rates than we would have with city ownership; . . . evidence that any loss of contributions to the general fund will be compensated for in some manner; (and) the sale price must reflect full market value as generally recognized in the industry."

Pointing out that the possible sale of the utility "has been a general topic of discussion for some time," Pursell said the time had come to

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(typical plug-in, shown actual size)

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453B	AMPLIFIER, REPEATER
455B	AMPLIFIER, REPEATER
457B	AMPLIFIER, REPEATER
460A	AMPLIFIER, COMPRESSOR
461A	AMPLIFIER, POWER
12912	EQUALIZER
13530A	COMPROMISE NETWORK
13531	NETWORK H88
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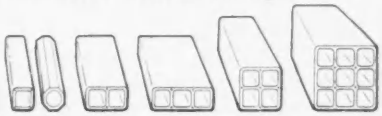

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Telephone Engineer & Management will send a free copy of the new "TELEPHONE HANDBOOK FOR PLANTMEN & MANAGERS" with each gift subscription ordered through December 15, 1961.

"express ourselves as a body and to list points that are of interest to the council."

He said he was in favor of selling the system if certain objectives were obtained.

"I firmly believe," he said, "that if private industry can furnish the services, the city government should bow out. I do think that we must recognize, though, what the utility means to the city. This past year, the telephone utility made payments in lieu of taxes of over $200,000. In addition, a contribution of more than $300,000 was made to the general fund by the telephone utility. This totals over one-half million dollars and without this contribution, our tax bill would be higher. It is true that if the system were sold for several million dollars it would allow us to pay off a portion of our bonded indebtedness and reduce our debt service requirements.

"However, if we were to lose a part of the contribution without a reduction in telephone rates I might possibly change my mind about the desirability of selling the system. The wrong deal could cost us in the long run."

Councilman William Besser, who cast the lone dissenting vote, said that "just because the voters were against the bond issue doesn't mean they want to sell the system." He said the voters were indicating they wanted to reduce expenditures. "I don't think a lot of people know that the telephone system is a money-making proposition," he added.

City Manager Chet Hostetler warned that the utility, if privately owned, "will come under the State Public Utilities Commission. The council is going to lose the right to regulate telephone rates. It would have no jurisdiction."

Councilman Frank Harris noted that payments in lieu of taxes are made from revenues collected for telephone service outside the city, which would not be paid by the purchaser.

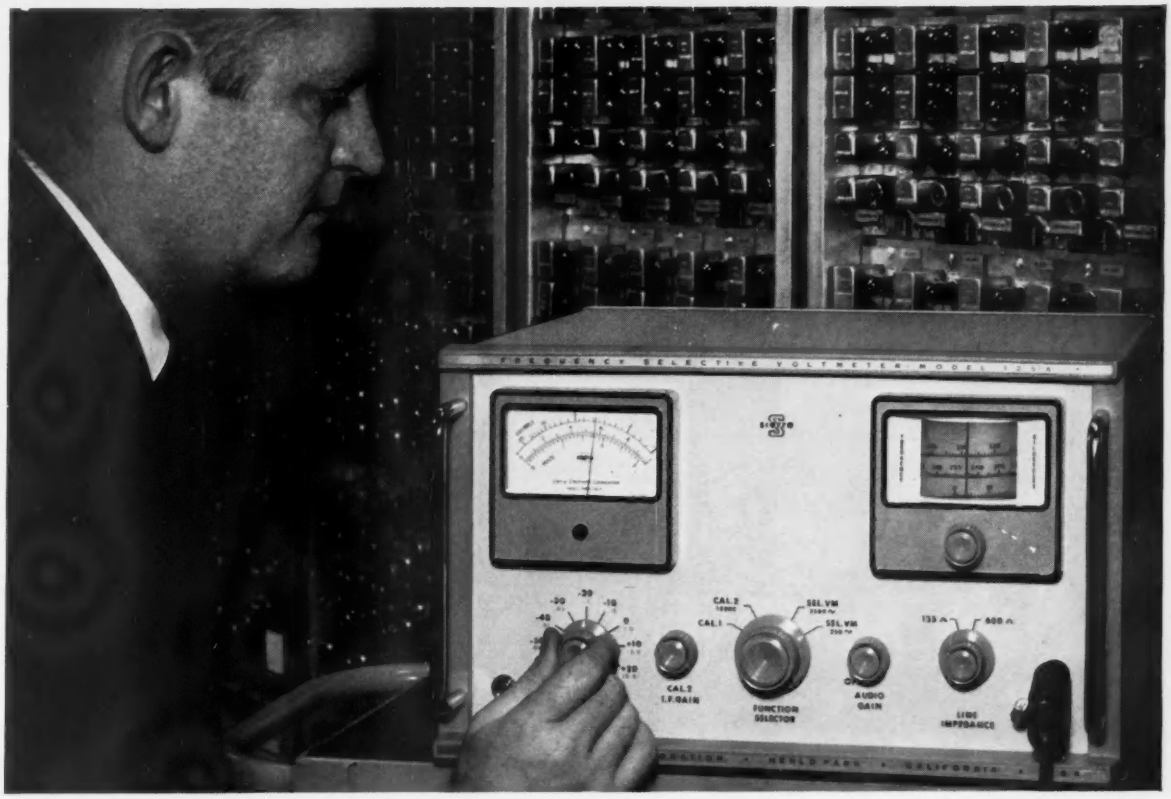
Gen. Tel. Co. of Wis. Holds Seat Belt Campaign

THE GENERAL Telephone Company of Wisconsin recently has completed a Seat Belt Campaign resulting in installation of safety seat belts in all passenger cars operated by the company, as well as in cars owned by many of the company's 1,500 employes.

After installation of belts in company cars, the firm made an offer with the company supplying the belts, enabling all workers to buy belts at reduced rates. Safety Director S. F. Glazer of Gen. Tel. Co. of Wis. originated and coordinated the program.

The firm's employe newspaper announced the plan. *Wisconsin General News* carried a series of articles on the value of seat belts as well as in-

Mechanics make safety check on car of Madison office employe of Gen. Tel. Co. of Wis., while policeman talks with driver about auto safety laws in Madison and rest of Wisconsin.



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TE&M's ANNUAL TELEPHONE INDUSTRY FORECAST

■ Want to *know what's ahead* for the telephone industry in 1962? You'll *find the answers* in the Jan. 15, 1962 "*Telephone Industry Forecast & Survey Issue*" of TELEPHONE ENGINEER & MANAGEMENT.

■ This big, information-packed issue will feature state-by-state reports on the *growth of the telephone industry* in 1960 and 1961 — and *forecasts of the industry's growth for* 1962.

■ From cover-to-cover, the Jan. 15, 1962 "*Telephone Industry Forecast & Survey Issue*" of TELEPHONE ENGINEER & MANAGEMENT will be an issue you will want to read and retain for future reference.

■ Just to sample what's coming, check the following list of the exclusive features you'll find in the Jan. 15, 1962 TE&M . . . Then — enter your *personal subscription* to TE&M. That's one way of making sure you will receive a copy (you can keep) of TE&M's "*Telephone Industry Forecast & Survey Issue*" and the 23 other important issues TE&M will publish in '62.

1 — INDUSTRY FORECAST

"TE&M's SECOND ANNUAL TELEPHONE INDUSTRY FORECAST & SURVEY."

By John G. Reynolds, Editor of TELEPHONE ENGINEER & MANAGEMENT.

A new year means the start of a new growth period for the communications industry and the reappearance of such questions as — *"Will station gains continue?" . . . "Will operating revenues increase?" . . . "Will expansion—improvement projects continue?"*

These and many other questions will be answered by TE&M's survey of operating data supplied to its research department by the nation's telephone companies.

By text, charts, graphs, and tables, the lead article in the Jan. 15, 1962, "*Telephone Industry Forecast & Survey Issue*" of TE&M will:

(1) Present a complete statistical summary of the telephone industry, giving growth data for the 3-year period 1960-1962.

(2) Report the total gross construction additions planned by the telephone industry for 1962.

(3) Indicate state-by-state trends in telephone growth, gross construction additions, and gross operating revenues.

(4) Tell the story of progress made by the Independent telephone industry, the REA-financed companies, and the Bell System in 1961 and their plans for 1962.

2 — GROWTH DATA

"TE&M's 1961 SURVEY OF THE TELEPHONE INDUSTRY."

By TE&M's Research Department.

In 1960, 404 of the nation's telephone companies responded to TE&M's request for operating data. This year over 2,000 of the nation's telephone companies are being asked to provide complete information on their operations for 1960, 1961 and forecasts for 1962.

Using the data provided by the companies, TE&M's Research Department will build a report that will provide telephone growth data on each state for 1960, 1961 and 1962. In 15 or more tables this important report will discuss:

(1) Number of exchanges operated in each state.

(2) Number and types of central offices in operation.

(3) Summary of dial, common battery and magneto telephones in service in each state.

(4) A state-by-state report on gross construction additions — outside plant, central office, station equipment, land and buildings, etc.

(5) Summary of total communications plant in service by states, 1960, 1961, 1962.

(6) State-by-state trends in telephone growth, revenues, and expenditures for expansions and improvements for 1960, 1961, and 1962.

3 — OPERATING DATA

"TELEPHONE INDUSTRY STATISTICS."

By TE&M's Research Department.

What's happened to the U. S. telephone industry since 1956? You'll find the answer to that question in the statistical section of TE&M's "*Telephone Industry Forecast & Survey Issue,*" in charts and tables giving the year-by-year story on the telephone industry's growth from 1956 through 1961.

Exclusive tables and charts prepared by TE&M's Research Department will present statistics on:

(1) Telephones in service.

(2) Operating companies — Independent and Bell.

(3) Number of exchanges.

(4) Investment in telephone plant.

(5) Gross operating revenues.

(6) Number of employes.

(7) Growth data — Independent, Bell and total telephone industry.

(8) Data on equipment produced by the communication equipment manufacturing industry — telephones, dial C.O. equipment, dial PAX equipment, manual C.O. equipment, telephone booths, cable terminals.

(9) Reports comparing the telephone growth of each state with the growth in population as indicated by U. S. census reports.

4 — WASHINGTON

"THE SECOND YEAR OF THE NEW FRONTIER."
By Fred Henck, Executive Editor of "Telecommunication Reports," Washington, D. C., and TE&M's Washington Editor.

What about the "New Frontier" and its effect on the communication industry and business in general?

That question and others will be answered by Mr. Henck in an exclusive report scheduled for publication in the Jan. 15, 1962, *"Telephone Industry Forecast & Survey Issue"* of TE&M, as the author draws upon his many years of Washington experience to point up to some significant guideposts of major importance to the communication industry.

5 — PLANT FORECAST

"THE 'NEW' IN TELEPHONE PLANT IDEAS."
By John S. Reed, Technical Editor of TELEPHONE ENGINEER & MANAGEMENT.

Just as it has in the past, telephone plant improvements will highlight the telephone industry's progress in 1962.

TE&M's Technical Editor, John S. Reed, is preparing a special article for the Jan. 15, 1962, issue of TE&M describing the new ideas that will speed plant expansions and improvements.

By text and illustrations, Mr. Reed's article will discuss:

(1) New prewiring methods.

(2) New types of construction trucks.

(3) Buried plant.

(4) Use of carrier and microwave to increase the number of available circuits.

(5) Improved types of aerial lifts.

(6) Satellite communications.

6 — ENGINEERING FORECAST

"BETTER TRANSMISSION IN 1962."
By C. D. Ehinger, President, Citizens Telephone Co., Decatur, Ind.

Better transmission is constantly becoming more important to all telephone companies and it will continue as a number one objective of the industry in 1962.

Mr. Ehinger's article will discuss the methods telephone companies are using to obtain good volume, faithful reproduction of the speaker's voice, freedom from echo and background noises, safety from electrical hazards, and emphasize that each company must give adequate attention to transmission maintenance.

7 — COMMERCIAL FORECAST

"IN 1962 MEET YOUR PUBLIC AT THE SERVICE CLUB LEVEL."
By Allan R. Stacey, Vice President, Sunland-Tujunga Telephone Co., Sunland, Calif.

The author of TE&M's popular feature department "Commercial Department Notes" believes telephone companies will have many communication stories to tell their customers in 1962. In this exclusive article, written for the Jan. 15, 1962, *"Telephone Industry Forecast & Survey Issue"* of TE&M, Mr. Stacey discusses modern methods of presenting a telephone company program to a community service club.

8 — SMALL COMPANY

"THE SMALL COMPANY JOB IN 1962."
By Bill Corman, Manager, Southland Telephone Co., Atmore, Ala.

What's ahead for the small telephone company?

In a special article, prepared for the Jan. 15, 1962, *"Telephone Industry Forecast & Survey Issue"* of TE&M, Mr. Corman will answer that question, and present proved-by-experience solutions to many of the problems that are causing trouble for some of the nation's telephone companies.

9 — TRAFFIC FORECAST

"PEOPLE — TRAFFIC's VIEW FOR '62."
By D. A. Perigo, General Traffic Manager, West Coast Telephone Co., Everett, Wash.

Is the Traffic Department's biggest problem in 1962 going to be people?

Author Perigo believes it will be, and in a special article, prepared exclusively for the Jan. 15, 1962, *"Telephone Industry Forecast & Survey Issue"* of TELEPHONE ENGINEER & MANAGEMENT, he presents a workable plan for meeting what may well be one of the industry's most pressing problems.

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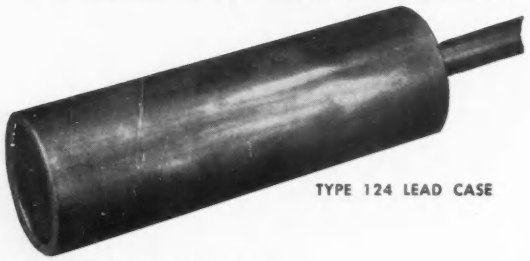

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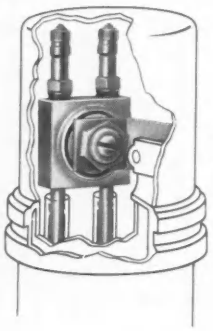

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Developed in collaboration with Bell Telephone Laboratories, Inc., each unit is equipped with two pressure testing valves and mounting bracket. Stainless steel diaphragm, operated by control screw in valve bonnet, is not affected by heat while soldering connections.

REQUEST complete data on this valve. Bulletin T-1a describes this and other Dahl pressure system valves for indicating and regulating air usage in continuous flow systems. G. W. Dahl Co., Inc., 80 Tupelo St., Bristol, R. I.

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structions to employes on how to obtain these *life-savers*.

About 215 belts had been sold to employes by the end of the campaign in July. Shortly after Labor Day, the offer was made again, and some workers now are taking advantage of reduced rates to buy their belts directly from the manufacturer.

Continuing with automobile safety efforts, the company also sponsored an auto safety check for employes in its general office in Madison, Wis. About 69 people brought their own cars to the safety check lane for inspection of lights, brakes, steering, and other car parts.

The safety check lane was operated by company mechanics, a local garage owner, the safety director, and the safety officer of the Madison Police Department Traffic Bureau.

No tickets were issued by the police for defective cars, but the officer spoke with each driver, answered questions about Madison and Wisconsin traffic laws and presented a booklet on the subject prepared by the Madison Police Department. A self-adhering card with the results of the check was placed under the hood and inside the door of each car checked.

General Telephone may sponsor other checks, not only for employes but for the people living in the communities served by the company.

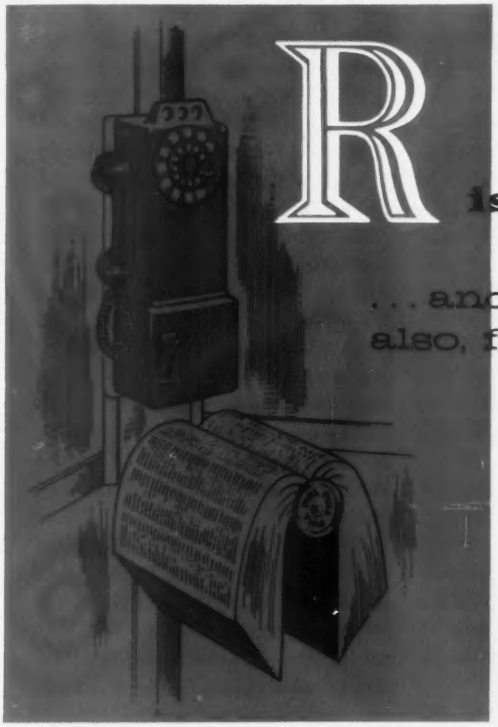
Symposium on Automata Mathematical Theory

THE TWELFTH Annual International Polytechnic Symposium to be held in New York City on April 24-26, 1962 will examine "The Mathematical Theory of Automata." The symposium will emphasize application of mathematical techniques to information-handling systems. Proposed topics to be included are:

1. Computability, classes of Turing machines and automata, unsolvable problems, problem complexity.

2. Symbolic logic, methods for programing logical problems, theorem proving, algorithms for quantification theory.

3. Procedures for search and learning, search in discontinuous and discrete systems, random versus sys-



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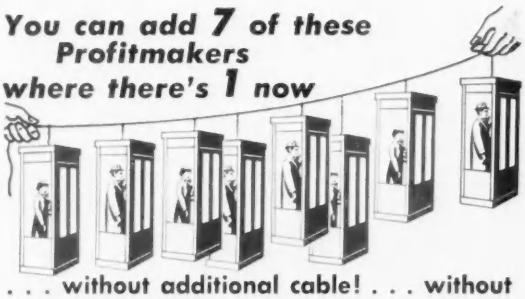

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4. Abstract algebra and linear graphs; applications of lattice theory, semigroups, rings, to coding languages and sequential transducers; application of linear graphs to route problems, state diagrams.

5. Synthesis procedures, design with "neurons" or other specific types of element, reliability.

Objectives of the 1962 Symposium are: To encourage the development and exposition of basic theories and mathematical tools of help to the engineer in analyzing, designing, and using information-handling systems; and to provide a forum for exchange of ideas among applied mathematicians, computer engineers, and those interested in information theory to stimulate further development of branches of mathematics which might be used in a theory of digital devices.

The program will contain invited and contributed papers as well as a round-table discussion of future trends. The *Proceedings* will be published in book form as Volume XII of the Polytechnic Symposia Series.

This year the symposium is organized by the Departments of Electrical Engineering and Electrophysics in cooperation with the IRE professional groups on electronic computers and information theory and the Science and Electronics Division of the AIEE.

Co-sponsors include the Air Force Office of Scientific Research, the Office of Naval Research, and the U. S. Army Signal Corps. Information may be obtained from Professors A. E. Laemmel and E. J. Smith, co-chairmen of the Symposium Committee.

Closing date for submission of contributed papers or 200-word abstracts is Jan. 5, 1962. Write to: Symposium Committee, Polytechnic Institute of Brooklyn, 55 Johnson St., Brooklyn 1, N. Y.

ICC Approves New Type Buried Cable Installation

COMMONWEALTH Edison Co., and Illinois Bell Telephone Co. have been authorized by the Illinois Commerce Commission to make a new type of joint installation of underground cable in new residential developments on an experimental basis, James W. Karber, chairman of the commission, has announced.

Karber said the test installations now approved will be the first of the kind in the country. He said the order issued by the commission will permit the utilities to install electric and telephone cables in a common trench without separating them. The underground installations covered by the order will be limited to service for 10,000 homes between now and June, 1963.

"In recent years," the commission order said, "there has been a substantial increase in the use of buried cables to furnish telephone and electric service, particularly for distribution in subdivisions in which a number of houses are constructed side by side at the same time. Buried utility cable construction is considered more desirable than aerial construction by a steadily increasing

number of developers and consumers. The chief objection to its wider use has been the initial cost of construction. One of the substantial items in such cost results from the need to maintain at least 12 inches of separation between the two sets of cables."

The evidence shows that the elimination of the requirement for 12 inches of separation can reduce the cost of digging and backfilling by about 24 per cent, according to the order. While this is a relatively small part of the total cost of the plant required to render underground service, it should stimulate the use of buried construction. In its order the commission found that the proposed underground installation of electric and telephone cables will not incur undue risk of injury to persons or of damage to property.

Phone Rate Case Review Asked by Oregon Court

A RULING handed down by the Oregon Supreme Court has directed the state public untility commissioner to re-examine a 1958 finding that denied the major portion of a rate increase sought by Pacific Telephone & Telegraph Co.

Commissioner Jonel C. Hill was directed by the court to enter new findings in the case, which was decided by Hill's predecessor, Howard Morgan.

The ruling involved the amount of an increase that the company should get for rates on intrastate service based on its Oregon properties, which are now held by Pacific Northwestern Bell, a subsidiary.

Morgan permitted an increase of $759,000 of a $1,858,000 requested. The court said he refused to make allocations of investment and expense items between intrastate and interstate commerce based on recognized standards adopted by the utility industry and other states.

The Public Utility Commission office said this was a reference to the manual of the National Association of Railroad and Utility Commissioners. It said Morgan substituted the findings of the commission's staff and consultants. The Oregon commission had never officially adopted the national manual.

A commission spokesman said it was impossible to immediately say whether the ruling would cause an additional telephone rate increase, but doubted that any possible increase would be retroactive.

The high court said that in considering intrastate rates, Morgan refused to consider an amount of more than $6 million in plant and investment and some $132,000 in expenses and taxes that result from it.

The court noted that interstate rates are fixed by the Federal Communications Commission. It also pointed out that if the company cannot get an increase in its interstate rates and intrastate rates do not consider this investment, then the company cannot get a return based upon the investment.

The tribunal said Morgan had reached his conclusions based upon a formula which in effect valued interstate calls at three times as much as local calls.

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to be published January 15

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"Let me congratulate you on the splendid job done on the 1961 Forecast Issue. It is by all odds one of the best trade journal jobs I have seen and the reaction from many of our member companies has proven this so. Certainly it will make a real contribution to our segment of the industry in making the Independents look ahead." *Signed, Charles D. McLellan, Exec. Sec'y, Michigan Independent Telephone Ass'n.*

From the Oregon Independent Telephone Association February Bulletin: "The Jan. 15 issue of TE&M features forecasts of the development of our industry in the coming year, by a number of well known writers on the subject. In addition, there is a 15-page compilation of statistics, compiled from 404 independent telephone co.'s reporting to TE&M, projected to the end of this year on the estimates submitted. To the telephone manager who is alert and keeps his finger on the pulse of the future, this will be an excellent index to the state of our business, as it is and will be in the months to come. TE's editor John Reynolds is to be congratulated on a job well done."

OVER 2,000 COMPANIES HAVE BEEN ASKED TO SUBMIT DATA FOR THE COMING 1962 SURVEY

Every telephone company, Independent, REA or otherwise, will be eagerly awaiting this important issue. Many manufacturers and suppliers will be basing their production and sales plans for 1962 on the figures brought to light in this issue.

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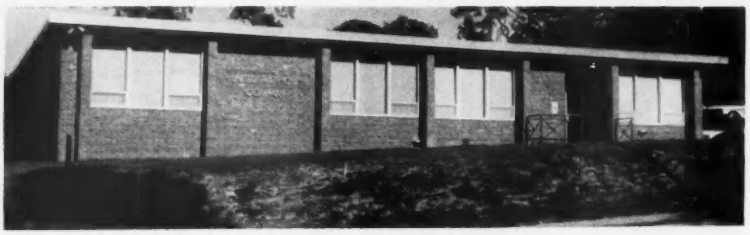

First commercial use of an electronic Private Branch telephone exchange is at new Southern Pines, N. C., headquarters of the United Telephone Co. of the Carolinas, Inc., a wholly-owned subsidiary of United Utilities, Inc.

United Tel. Co. of Carolinas Now Using Electronic PBX

A STROMBERG-CARLSON® electronic Private Branch Exchange (PEBX), used as a commercial system by a telephone company, became an operating reality on October 21 when a production PEBX, designed and built by General Dynamics | Telecommunication, Rochester, N.Y., was put in service by the United Telephone Co. of the Carolinas, Inc., at Southern Pines, N. C. The system is trade-named *Dynalogic®* by its originators.

Among the new subscriber services offered by the electronic switching are: Transfer of an incoming call from one line to another by the station instrument user; conferences of the "party-added" type, including outside as well as PBX telephone stations; pre-arranged call forwarding, whereby for any limited period calls incoming to one telephone will be forwarded to another selected extension; direct inward dialing from an outside line to the electronic PBX extension; faster, more efficient operator service, which frees the attendant to perform other part-time duties.

At an informal demonstration of the Southern Pines' PEBX to a group of visitors from neighboring Independent telephone companies, E. V. Smail, president of United Tel. of the Carolinas, and R. R. Dobbin, vice-president — engineering of General Dynamics | Telecommunication, explained the new subscriber services in detail.

The Southern Pines PEBX permits the on-the-go businessman to be sure that all calls placed to his extension are received. An Automatic Call Forwarding feature forwards all calls to him at any extension he designates.

Outside calls can be placed to the PBX without tying up regular Central Office trunks. This is accomplished over Direct-Inward-Dialing trunks which permit calls directly to a PEBX extension without assistance from the attendant.

Important executive calls can receive priority treatment in the Southern Pines electronic PBX. An Executive Right-of-Way feature permits top management personnel to reach an extension even when it is busy.

Conference calls for up to five parties can be set up in a matter of moments by any PBX party. Or if desired by the conference originator, the attendant can contact all the conferees, making all arrangements for the conference.

On calls which require information not readily available to the called party, an inquiry feature helps supply the answers. A third party who has the information available can be contacted while the original calling party is held on the line.

A routine task that eats up the attendant's time on some conventional PBX's is transfer service. At Southern Pines, transfer is accomplished without requiring the attendant's assistance. To transfer a call, a PBX user simply dials the extension which is to accept the transferred call.

The Southern Pines' electronic PBX supplies full 24-hour service. After-hour calls are automatically transferred by a Night Service feature to predetermined extensions. Two such extensions are available. One can be used for night service, one for week-end service.

Certain phones in the Southern

Pines installation will be limited to internal calls except in the case of emergency. This prevents unauthorized outside calling and keeps the maximum number of trunks open for business purposes.

Another time-saving feature of the PEBX is an Unlisted Number Recorder. When an unlisted PBX number is dialed, immediate positive action is taken to inform the caller of his error. This is accomplished by a recorded message which automatically begins playing when an incorrect number is dialed.

Whether all of the extra services are used or not, the manufacturer states the electronic PBX improves the grade of service in ordinary telephone communication through the principle of full availability of connecting circuits. When a user requires service, there is switching equipment immediately available to him. Another feature of the *Dynalogic* concept is micro-second speed of operation.

"To realize the speed capabilities of electronic switching," Vice President Dobbin said, "remember that there are more micro-seconds in one minute than there are minutes in an entire century! At these speeds, literally hundreds of service demands can be recognized and dispatched in the time it takes a qualified manual operator to complete one connection, or for a mechanical switch to step up and around.

"This speed," explained Dobbin, "is utilized in accessing the memory device, where calling and called line information is temporarily stored. Speed in operation thus becomes the equivalent of adding extra equipment that would become necessary under slower, conventional-type systems. The practical limit of physical expansion for some telephone companies is already strained. Using conventional equipment to meet the new requirements in the same old way is like trying to balance a pyramid on its point — a gargantuan monster whose complexity can defeat its purpose."

The electronic switching of voice and data communication is based on the idea of Time Division Multiplex-

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New Book on Financing

■ **"Long-Term Financing," by John F. Childs; 369 pages; 8½" x 11"; $12.50; Prentice-Hall, Inc., Dept. TE&M, Englewood Cliffs, N.J.**

This book has been specifically designed to serve as a practical guide and working tool for the men who have to raise the money for their company. It shows what you need to do, and what steps to take, to manage your share of the more than $425 billion of capital invested in United States' corporations today. It shows, step by step, how to do the actual financing and solve the many problems that financial officers of companies face.

Whether your company is large, of medium size, or a smaller one with an eye toward expansion, you will find practical guidance on how to establish financial policies on which to base sound growth. This book will assist you in making correct decisions, so your company and its owners, the stockholders, may derive the greatest benefit over the long run.

Among vital questions answered in the book are these: How much debt your company should carry; what your dividend policy should be; how best to sell senior securities and common stock; how to attract new investors; how to base your financial decisions on the wants of common stockholders. Soundly-run companies are relying today for their long-term financial growth on the answers to such questions.

One of the unique features of the book is a comprehensive treatment of the highly important field of investor relations. Success in this area is just as important as your capital structure, your dividend policy, or any other part of your long-term financing program.

Long-term financing is not a mysterious subject, but it is a fascinating one. This book strives to remove the mystery and enhance the fascination of this vital topic. Above all, it emphasizes practicality. This is not a book simply to be read and put on a shelf; it is a book to be used. It is so designed that you can turn readily to the subject of your immediate interest for timely guidance in your job of managing your company's finances and setting its profit goals.

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Compact desk turret used with the Dynalogic PBX in this commercial office at Southern Pines, N. C., applies modern business machine approach to communications. Illuminated, touch-keys immediately activate electronic circuits to speed operator's work, permitting her to serve also as cashier-receptionist.

ing. Here is how TDM works: A simple analogy is talking to someone on a moving carousel while you stand in one spot beside it. As the carousel gathers speed, your conversation with this one person approaches nearer and nearer to perfect continuity. If you can imagine a carousel moving at 10,000 revolutions per second — the repetitive cycle, or scanning rate, of *Dynalogic* — it is easily seen that conversation between you and the rider proceeds with no interruption whatsoever. Electronic circuits in the *Dynalogic* system provide the necessary separation in timing, so that you talk to and are heard by only the one rider with whom you wish to communicate.

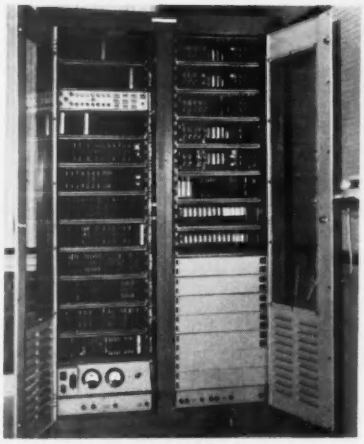
The Time Division Multiplexing principle makes it possible to handle many simultaneous conversations over one voice channel. TDM converts the normal voice signal on an incoming telephone line to many narrow pulses. These pulses are handled in a positive sequential arrangement through the switching network and converted back to normal voice signals at the outgoing end.

Each of the audio inputs (conversation or data), as well as demand and control signals, is scanned repetitively for a micro-instant of time. The scanning rate (repetitive cycle) is 10,000 times per second. Each sample or pulse — one per conversation — is transmitted sequentially in its allotted time position over one channel, from the calling line circuit to the called line circuit. These pulse time positions become the links or paths through the system.

The pulse time positions (or links) are alloted to lines as the lines require service. The use of recently perfected high-speed switching transistors makes it possible and practical to handle 100 simultaneous conversations through a *Dynalogic* switching system.

According to the manufacturer the advantage of the TDM principle is in translating the conversation and control intelligence into pulses arranged sequentially in time, rather than into physical components. It is reported that this technique provides a more economical system, because less interconnecting wiring, smaller space and fewer components are required.

Spokesmen for General Dynamics | Telecommunication state that delay line storage devices have now been improved in performance so the benefits to be derived from this technique can be realized in a system of tele-



October 21 marked the beginning of completely electronic private business telephone service. In use in a commercial office at Southern Pines, N. C., this Stromberg-Carlson® electronic Private Branch Exchange brings new service features to customers.

phone quality. A delay line is a piece of wire possessing the property of transmitting a pulse over its length in a fixed interval as defined by the system design. As applied to *Dynalogic* switching, the delay line stores control and supervisory pulses in groups of 100 (one per link) until needed. These pulses are taken out of the delay line storage sequentially as required by the common control of the electronic switching system. Delay lines make practical the circuitry which stores the calling line number, identifies the called line, and arranges to connect these two together.

According to the manufacturer, *Dynalogic* uses common control principles, but in an entirely new configuration that for the first time provides a compact and flexible switching system. All services required by today's subscriber are provided. It is claimed that the design recognizes and provides for the many new features that will be requested by subscribers and required by the telephone companies.

The United Telephone Co. of the Carolinas has taken the lead in placing this new concept of telephone communication in service.

"In the short time since the equipment in Southern Pines was made operative, many visitors from the area and from distant parts of the

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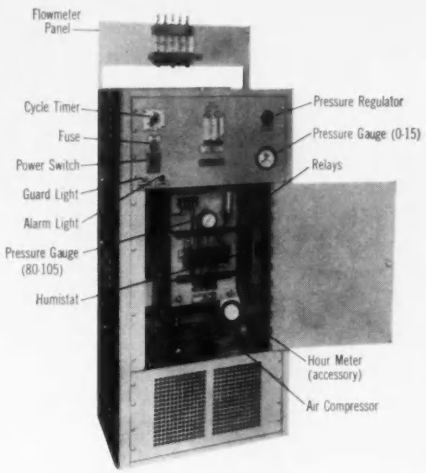

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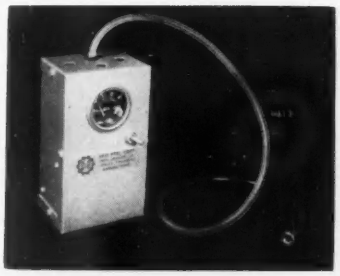

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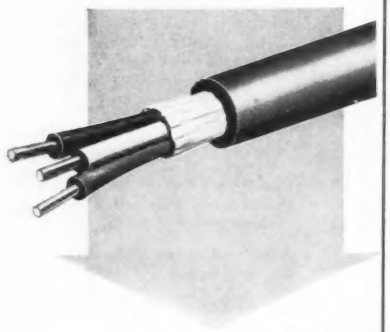

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country have come to observe the switchboard in service," reports President Smail. "What they saw at Southern Pines is a system that permits flexibility in configuration, reduces operating and maintenance cost, and provides for new services already coming into demand. *Dynalogic* meets the policy objectives of companies like the United Tel. of the Carolinas, whose growth demands integration of the present with the future."

The first commercial use of *Dynalogic* switching is in the Private Electronic Branch Exchange. This form was selected for the Southern Pines installation, according to Paul H. Henson, executive vice president of United Utilities, Inc., because it can provide a ready-made "school" for in-service training of telephone company personnel in a planned program, and company employes can become thoroughly familiar with the new system before installing a Community Electronic Dial Office or a Main Electronic Dial Office.

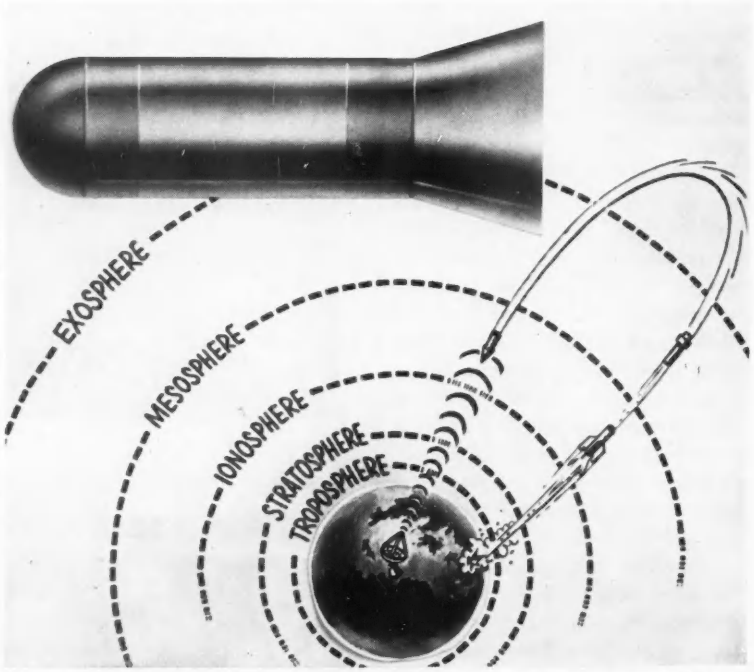
In reviewing the continuing program of electronic switching at General Dynamics | Telecommunication, T. C. Thompson, vice president — sales, stated that the second phase — a Community Electronic Dial Office — has been sold and will be cut into service early next year. According to John H. Voss, General Dynamics | Telecommunication president, this electronic CDO expands the *Dynalogic* principles into a full-scale telephone exchange, and will, for the first time, bring to all the subscribers in an entire community the advantages of an electronic telephone system.

Probe Space Vehicle Re-entry Communications

SCIENTISTS are simulating re-entry of space vehicles into the earth's atmosphere in studying effect of flow of ionized gases around nose cones on radio communications to and from these vehicles.

The applied Research Laboratory of Sylvania Electronic Systems and the Canadian Armament Research and Development Establishment (CARDE), Valcartier, Quebec, are conducting the study.

CARDE technicians simulate re-entry conditions by firing small free-flight models of re-entry vehicles from a light gas gun at speeds up to 21,000 ft. per second. The models



Communications with actual re-entry vehicle is shown. Test projectile used in simulation program appears at top left.

are launched into an evacuated tank with air pressure typical of the earth's upper atmosphere.

Each model contains a microwave crystal radio receiver and telemetering transmitter. Models are 2 in. in diameter and are subjected to shock loading of more than 150,000 times the force of gravity when fired down the ballistic range.

On launching, equipment in the projectile model receives and transmits signals through a plasma sheath to and from communications equipment in the range. Data is magnetic tape-recorded for evaluation. (Plasma sheath is an electrical conductor created around high-speed re-entry vehicles by compressed, heated air.) Radio signals transmitted through the sheath are weakened.

Paul F. Radue Joins Lynch Marketing Div.

PAUL F. RADUE has joined Lynch Communication Systems Inc. as an applications engineer in the Marketing Division, reporting to David Shisler, manager of application engineering. He is engaged in product planning, microwave system engineering and carrier application engineering which will involve investigating new market areas, determining customer needs and translating these into technical design parameters for new equipment.

Before joining Lynch, Radue was planning engineer with ITT Kellogg, Chicago, for 1½ years. Previously he was carrier and radio staff engineer with Automatic Electric Company, Chicago, for seven years and with American Telephone & Telegraph for seven years. He has had two professional papers published. Radue attended Wartburg College, Waverly Iowa.

Pitman to Manage Market Research for G. E. Com. Prod.

JAMES E. PITMAN has been named manager of marketing research and planning for the General Electric Communication Products Dept., Lynchburg, Va. Previously manager of product planning for point-to-point communication, Pitman now will be responsible for market-

The Outdoor Telephone Canopy (GP-2500, List 1) is a revenue builder in the daytime or at night. And it's constructed to last for years.

The large, easy-to-read lettering is silk screened in red or blue on the white canopy. The lettering stays bright and colorful for years. Unless specified differently, red will be shipped.

At night the unit and surrounding area are lighted by 32 watts of fluorescent lighting. If in an area where bugs are easily attracted, the canopy can be treated to provide a yellow light invisible to most bugs.

The large canopy protects the caller from the sun, yet there is complete air circulation. The clear plastic sides provide adequate protection in slightly bad weather. Also, these clear plastic sides discourage tampering with the telephone.

The Outdoor Telephone Canopy can be pole, wall, or pedestal mounted. When pedestal mounted, the total height of the unit above ground is 88″ The dimensions of the unit are 56¼″ high, 30¼″ wide, and 39″ deep. *The GP-2500, List 1 is shipped complete with pedestal, ready to install.*

Gladwin manufactures many products for the telephone industry. Included are Shelf-Ettes®, Boothettes®, a variety of lighted and non lighted signs, and display stands. Write for a free catalog today.

GLADWIN PLASTICS, INC.
165 COURTLAND ST., N. E.
ATLANTA 3, GEORGIA - 525—5384
Area Code 404

FLEXIDUCT
in
world-wide
use

takes
wiring over
any floor

Installations in all 50 states, Canada, Mexico, Europe, South America, nearly every foreign country.

Made of durable, extruded rubber; most efficient electrical and communications over-floor wiring protector; flexible, economical, permanent. Easily, quickly cemented down—no noisy drilling, pounding. Caster-based equipment rolls safely, smoothly over beveled sides. With universal parts, fittings (tee, ell, riser, combination).

3 Flexiduct sizes: from single conductor to 75 pair cable, plus quarter round.

Always keep Flexiduct on hand. Available through:

Buckeye Telephone & Supply Co.
Graybar Electric Co., Inc.
ITT Kellogg
Leich Sales Corp.
Stromberg-Carlson
Winders & Geist, Inc.
Western Electric Co., Inc., supplies Bell Systems only.

Write for descriptive folder.
WINDERS & GEIST, INC.
2219 North Cotner Blvd.
Lincoln, Nebraska

ing research on product lines made by the department. He also will handle evaluation and planning relative to new market opportunities.

Pitman joined General Electric in 1958 as a commercial engineer. Prior to 1958, he had worked for about 10 years in microwave equipment design, tropospheric scatter systems design, and microwave equipment engineering, including systems design of military microwave links.

An affiliate of the American Institute of Electrical Engineers, Pitman was graduated from Harvard College in 1949 with a bachelor of arts degree in physics.

Jamile Chopani, John Kevill Join Lynch Com. Systems

MISS JAMILE CHOPANI has joined the Public Relations Department, and John F. Kevill is now a member of the engineering staff, of Lynch Communication Systems, Inc., San Francisco, Calif.

Miss Chopani will be assistant to Forrest Beard, manager of advertising and sales promotion. Kevill will work chiefly in design and development of new systems.

Before joining Lynch Miss Chopani worked in the Advertising Dept. of *Barron's Weekly*, New York. Previously, she had been assistant editor-writer at the Monmouth Publishing Company, New York. She received a BA degree from Brooklyn College in New York.

A graduate in engineering from the University of Nebraska, Kevill has worked at Hazeltine Corp., Indianapolis, Ind., and with Allison Div. of General Motors, also at Indianapolis.

International Paper Advances J. W. Acton

JAMES W. ACTON has been named controller of two International Paper Co. divisions. He succeeds F. L. Patrick, who has been named controller of Western operations for the company's Long-Bell Division and transferred to Longview, Wash.

Acton joined the Long-Bell Lumber Co. in 1948 at DeRidder, La. That company merged with and became a division of International Paper in 1956. In 1957 Acton was made controller of accounts for the new division's seven southern plants.

In 1958, when the plants and two others on the West Coast were redistributed between the newly created Wood Preserving and Southern lumber divisions, Acton was transferred to their headquarters in Mobile as assistant controller, a position he held until his recent promotion.

Vernon Hedges Sales Rep. at Alpha Microwave Sys. Div.

VERNON HEDGES is now microwave sales and engineering representative for the Microwave Systems Div. of Alpha Corporation.

All of the Collins Radio Company microwave sales, systems engineering, contract administration and customer service were recently integrated into Alpha Corporation, a division of Collins.

Hedges will headquarter at Galion, Ohio, to represent Alpha microwave activities in Ohio, Pennsylvania, Virginia, West Virginia and New York, excluding New York City.

Previously he worked in sales and engineering throughout the United States for North Electric Company, joining that company in 1955. For the past three years he has conducted symposiums on carrier equipment applications and maintenance. He also had been for 12 years in the Communications Dept. of the Pennsylvania Railroad in Chicago.

Hedges attended Chicago Technical College and the National Radio Institute, Washington, D.C.

Carroll, Schaffer, Depner to AE Co. Production Posts

B. A. CARROLL, superintendent of technical services, has been named factory superintendent at Automatic Electric Co., Northlake, Ill. Replacing Carroll as superintendent of technical services is John W. Schaffer, manager of the Industrial Products Div. since 1958. W. A. Depner, formerly manager of switchgear production control, moves up to manager of the Industrial Products Div.

Carroll joined the company in 1934 as a student engineer. He be-

came inspection engineer, chief inspector, and supervisor of manufacturing engineering before his appointment as superintendent of technical services in 1955. Born in Asheville, N.C., Carroll studied engineering at Columbia University and at Armour Institute (now Illinois Institute of Technology).

Schaffer now is responsible for inspection, process engineering, manufacturing methods engineering, quality control, and tool and machine engineering. After receiving his BS degree in mechanical engineering from Purdue University in 1948, Schaffer started with AE Co. He has since done graduate work at Illinois Institute of Technology.

Depner will supervise production of relays and other components and assemblies for industrial use. He also is to work in application engineering of these products. Starting as an errand boy at the company 32 years ago, he has advanced through production jobs to his present position.

New Communications Center Serves Chicago Police Dept.

THE CHICAGO POLICE Department is speeding up its emergency service with a new $2 million communications center. The system, two years in planning, was placed in full operation on Thanksgiving.

The first phase, a teletypewriter switching system designed and installed by Automatic Electric, Northlake, Ill., recently was placed in service. The system has 17 teletypewriters at the center linked to eight police areas covering the city.

The central complaint room in the new center receives emergency calls from all over Chicago. Telephone operators relay complaints to teletypewriter operators who transmit them to proper area headquarters and selected district police stations. These operators also will dispatch police cars to the emergency scene by radio, when this phase is put into operation.

Two parallel networks installed by Automatic Electric send operational and administrative messages. One network is a two-way sys-

BUILT-IN BALANCE

WITH ALPHADUCT REINFORCED DROP WIRE

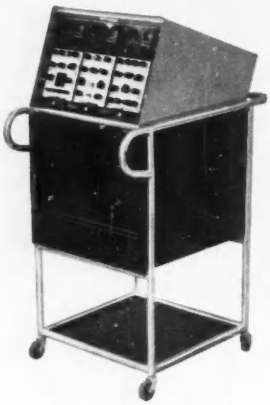
Balanced breaking strength of the conductors—400 pounds plus, with #18 AWG, 30% copperweld. Adhesion of the insulation—strong enough to prevent slipping at maximum load without physical or electrical failure. Neoprene jacket—tough, abrasion and weather resistant with enough "beef" to prevent buckling at the "P" clamps all the way up to maximum conductor strength. Compression cutting resistance—no break-down in "P" clamps up to overall breaking strength of the conductors. This sturdy balanced construction resists deformation and provides greater protection against lightning failures. This combination of exclusive Alphaduct features assures you of built-in balance for more years of trouble-free service and lower initial installation costs.*

National Distributors: Automatic Electric Sales Corporation, Northlake, Illinois; Leich Sales Corporation, 427 W. Randolph Street, Chicago, Illinois.

*It's dated for comparison.

ALPHADUCT
WIRE AND CABLE CO.
NEW BRUNSWICK, N. J.

ANTICIPATES
communications network
FAILURE!



Radiation's Telegraph Distortion Measurement System pinpoints potential trouble spots without interrupting traffic.

Even the non-technical operator can use this compact, self-contained system for continuous on-line monitoring of wire or radio telegraph and data links.

TDMS also—transmits perfect test signals—induces predetermined distortion—measures up to 50% signal distortion—permits adjustment of relays during operation — tests start-stop mechanisms — pictures line conditions and analyzes signal waveform, and can replace most teleprinter terminal maintenance and monitoring equipment.

Accessories include: Rack-mount; utility cart (pictured above); portable power supply; and relay-test adapter.

TDMS can cut operating cost and increase the efficiency of your communications network. Write for detailed data, Dept. T-121, Radiation at Orlando, 5800 McCoy Road, Orlando, Fla.

RADIATION at Orlando

Chicago Police Superintendent, ORLANDO W. WILSON, (center), listens to Automatic engineers, GEORGE PAVELL (left) and ROBERT HERZFELD, describe teletypewriter system they designed. With new system, central headquarters speeds operational and administrative messages to area headquarters and district stations.

tem in which machines send and receive messages. The other network uses send-only machines at headquarters, with receive-only machines at area and district stations.

The eight machines in the operations network, one for each police area, transmit complaint information. A key console at the side of each machine permits the operator to select and transmit to appropriate district stations in its area.

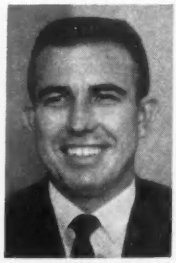
Eight other teletypewriters in the administrative network transmit bulletins on missing persons, wanted persons, stolen cars and routine information. The administrative system is expected to handle more than 100,000 messages in 1962.

The seventeenth teletypewriter in the communications center broadcasts to receive-only machines. The high-speed transmission machine is fed by punched tape. An additional bank of eight teleprinters is installed in the Press Room at headquarters to give newspaper personnel on-the-spot coverage.

When the communications center is finished, only one police phone number will be used for the whole city. District station numbers no longer will be in the phone book. Police vehicle dispatching will be greatly improved. Communication bottlenecks will be eliminated.

Moore, Kjos Manage Regions For International Teletronics

D. C. MOORE has been appointed manager of the Southwest Region for International Teletronics Inc., Dallas,



MOORE

KJOS

Tex. Paul E. Kjos will manage the company's Midwest Region.

Born in Boulder, Colo., Moore later attended the University of Southern California. His career in the telephone industry began in 1952 with Western Electric. He then joined the Public Service Company of Colorado. Prior to his recent position, he worked as communications manager for

a mining company. For International he will cover Texas, Oklahoma, Arkansas, Louisiana, and New Mexico.

Kjos attended school in Clarkfield, Minn. He joined the U.S. Navy in 1943 and worked for three years with fire control and communication systems. After military service he was with Western Electric for 2½ years as equipment installer.

Kjos next managed and operated an Independent telephone company in Minnesota for five years. He then worked for five years with North Electric Co. as warehouse manager and regional salesman covering eastern and southwestern states. He will cover Kansas, Nebraska, Missouri, Iowa, Minnesota and the Dakotas for International.

Buckeye Tel. and Supply to Sell for Northeast Electronic

THE BUCKEYE Telephone and Supply Company, Columbus, Ohio, is now the sales representative for the telephone test equipment of the Northeast Electronics Corporation, Concord, N. H.

Buckeye will handle Northeast's products in Minnesota, Iowa, Illinois, Wisconsin, Michigan, Indiana, Ohio, Kentucky, West Virginia, and western Pennsylvania from and including Harrisburg.

Buckeye will be Northeast's sales representative to all Independent telephone companies except the General Telephone System.

A. R. Reeland, Lenkurt Tax and Insurance Mgr.

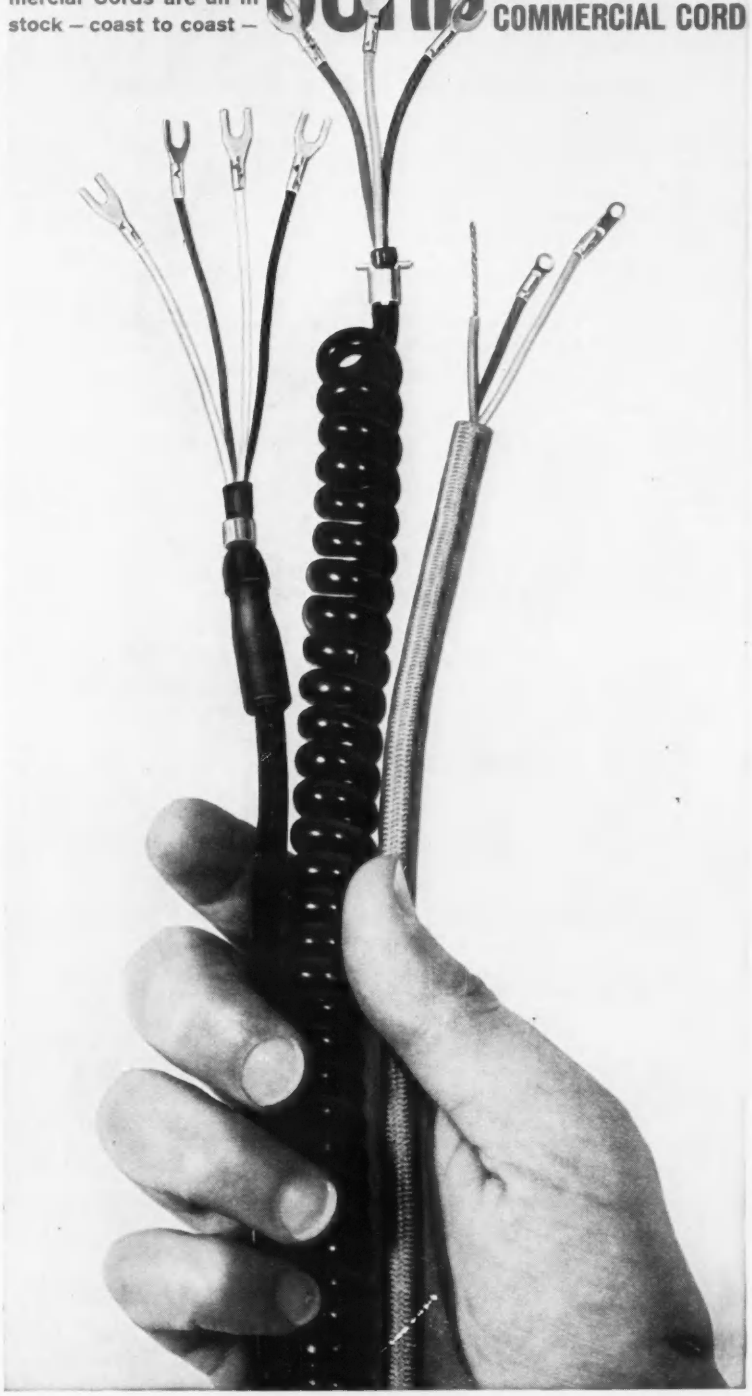
ARTHUR R. REELAND has joined Lenkurt Electric Co., Inc., San Carlos, Calif., as tax and insurance manager. He will report directly to Treasurer-Controller Lee G. Phillips, and will be responsible for centralizing control of the firm's tax and insurance matters, formerly distributed throughout a number of Accounting Department sections.

Reeland for five years had been assistant tax manager at Automatic Electric, Inc., Northlake, Ill. For a year before joining AE Co., he was a member of the Tax and Accounting Department of the Continental Telephone Co., Chicago. Reeland was an

...any cord. Commercial Cord has it! Patch cord, test cord...phone or intercom...straight cord or Spiraflex®...nylon jacket or colored PVC...standard, or any length or termination—Commercial Cord makes them all! ■Want cords fast? Commercial Cords are all in stock—coast to coast—for fast shipping to you. ■Get catalog, samples, prices from Commercial Cord Co., Clifton Springs, N.Y. Distributed by: Leich Sales Corp., 427 W. Randolph St., Chicago 6, Ill.; Automatic Electric Sales Corp., Northlake, Illinois

PiCKa CORD

COMMERCIAL CORD



Hi Folks!

Here are some of our guaranteed rebuilt instruments that look and operate like new. Also, our New Test Set. Drop me a line for quotes and our catalog.

Western Electric and Kellogg #500 Telephones
WALL or DESK MODELS

Factory Reconditioned Instruments equivalent to New with a full Guarantee and Refund Privilege. New Black Cases, Cords, and many new-surplus parts, including cycle ringers now available. Shipped 10 per carton, and we will pay the freight to your door on an order of 20 or more.

PRICE $14.50 — Dial Blank; or with Dial, Less Ringer (install your cycle)
PRICE $17.50 — With Dial and Straight Line Ringer
PRICE $19.50 — With Dial and Cycle Ringer — Harmonic, Synchromonic, Decimonic

LOOK — NEW!

BECO'S #1011 RUBBER TEST SET

Equipped with a Standard W. E. Dial and Components, Nylon Cord, Piercing Test Clips and Special Belt Snap. Rugged and Dependable.

PRICE $27.50

W. E. 354 WALL and W. E. 302 DESK TELEPHONES

Self-contained Sets with the appearance and operation of a new unit, equipped with Straight Line Ringer, or most Cycles can be supplied.
Price $10.50—Dial Blank, C.B.
Price $12.50—With Met. Dial

LATE COMPACT MAGNETO TELEPHONES
Stromberg-Carlson, Leich and Kellogg

We have a limited quantity of these late strong alnico generator type sets for those long rural lines, Reconditioned and ready to go. (Please state second choice.)

PRICE $17.50

BOHNSACK EQUIPMENT COMPANY
GERMANTOWN, NEW YORK
LEhigh 7-6213

auditor with the Harris Trust & Savings Bank, Chicago, for four years before that.

He received his BS degree in accounting from the Walton School of Commerce at Chicago in 1947, and prior to that attended Northern Illinois University.

Borchardt Nat. Ser. Mgr. for Motorola Com. and Electronics

ROBERT L. BORCHARDT has been appointed national service manager for Motorola Communications and Electronics, Inc., Chicago.

BORCHARDT

He will coordinate the firm's nationwide communications service activities. He also will direct Motorola's national communications service training program and the Motorola Training Institute.

With the company since 1950, Borchardt had been sales services manager. He holds a degree in electrical engineering from the University of Minnesota.

Anaconda Wire and Cable Starts Utilities Division

THE ANACONDA WIRE and Cable Company has established a Utility Products Div., with Austin W. Dunham as manager. The new division will be responsible for the marketing of utility products.

Dunham has been manager of utility sales since 1960. He joined the company in 1932, working mainly in sales capacities since then. He was district sales manager in Denver, Cleveland and Detroit before moving to the New York headquarters sales offices. While in Detroit, he served as president and a member of the board of governors of the Electrical Association of Detroit.

Copperweld Steel Wins Award

COPPERWELD Steel Company, Pittsburgh, Pa., has won a second place award for its stockholder annual report in the "Steel Industry" classification, covering companies

with assets less than $100 million. *Financial World* magazine presented the award to James M. Darbaker, Copperweld president, on October 30 in New York City. The firm placed second among 16 entrants in its classification.

Chairman of the award jury making the selections is Dr. Joseph H. Taggart, dean of the Graduate School of Business Administration, New York University. Other judges are Donald I. Rodgers, business and financial editor of *The New York Herald Tribune;* Alvin Eisenman, president of the American Institute of Graphic Arts; Donald B. Macurda, president of the New York Society of Security Analysts, Inc.; and Edward S. Wilson, past-president of NYSSA. In addition, 23 investment analysts from the society also served on the panel.

Promotions Announced By Rohn Manufacturing

LAST MONTH, Dwight Rohn, president of Rohn Manufacturing Co., Peoria, Ill., announced three promotions of staff personnel: Donald Rohn, to the position of assistant treasurer; William Hall, to assistant sales manager; and Grady Rooker, to coordinator of Sales Department.

These positions are newly created with new responsibilities, caused by new product lines for governmental, microwave, broadcast and communication tower users.

Bailey Nat. Account Exec. for Motorola Com. & Electronics

HOLMES BAILEY has been appointed national account executive for Motorola Communications and Electronics, Inc. He will be responsible for sale of portable and mobile radio communications equipment to telephone companies. This includes two-way radio, radiotelephone and VHF radio paging products.

Before joining Motorola, Bailey was product manager for communications equipment for AC Spark Plug Division of General Motors. He also has served as assistant to the vice president of field engineering and sales for Aircraft Radio Corporation, Boonton, N.J.

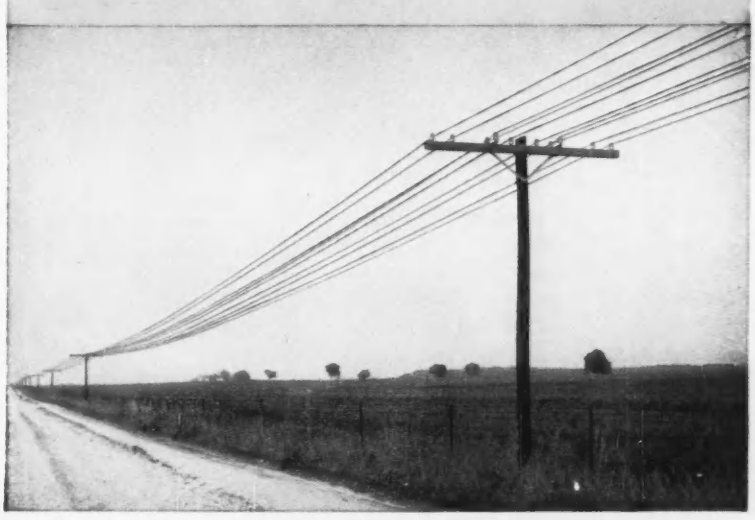
Crapo HTL-135

High Tensile Line Wire

MADE TO WITHSTAND HEAVY STORM LOADS

Time and time again, *Crapo* HTL-135 has demonstrated its ability to stand up under heavy ice and wind loads when other conductors failed. This can be attributed to the fact that *Crapo* HTL-135 combines high strength with high fatigue endurance plus superior elastic qualities which enable it to spring back into place when loads are removed. The result: service interruptions are minimized, re-sagging is seldom necessary, where this rugged telephone wire is used.

The excellent telephonic transmission characteristics of *Crapo* HTL-135 make practical subscriber loops of 14 to 15 miles with normal voltages and equipment. Longer loops are possible where higher voltages and more sensitive telephone sets are employed. For dependable, long-span, low cost rural lines, specify *Crapo* HTL-135.



HERE'S PROOF OF DEPENDABILITY

The Crapo HTL-135 in this typical rural line of 300-foot spans was subjected to two heavy ice storms within 14 months. This photo shows the line, without resagging, three months after the second storm.

Write for Manual TM-59 containing complete engineering data!

Crapo HTL-135
INDIANA STEEL & WIRE CO., INC. MUNCIE, INDIANA U.S.A.

INDIANA STEEL & WIRE CO., INC.
Muncie, Indiana

TELEPHONE MARKET PLACE

CLASSIFIED RATES: 15c per word, minimum charge $2.00. Cash with order. Add 3 words for box number. Closing deadline: Copy in written form in Chicago office no later than 20 days preceding publication date. DISPLAY CLASSIFIED RATES: Take card rate of $8.00 per column inch, and card discounts, size and frequency apply.

HELP WANTED

SALES ENGINEER — International Division U.S. wire and cable manufacturer, headquarters New York, has opening for Sales Engineer with outside plant experience and preferably some experience in electric power transmission & distribution. Some foreign travel required, must have outstanding sales personality, knowledge of foreign languages, particularly Spanish highly desirable. Age late twenties or early thirties. Salary to start $700-$800 per month. An excellent opportunity for future advancement. Please send full confidential information on personal, educational and professional background to Box 271 c/o TE&M.

CARRIER TRANSMISSION and Traffic Engineers for local and out of town positions. Send resume to Box 220, c/o TEM.

GENERAL TRAFFIC SUPERINTENDENT — Independent Company with 68 exchanges, 97% dial, 9 toll centers, 3 with DDD and 2 more in process. Total telephones 128,000. Opportunity and challenge for ambitious young traffic man. Northern Ohio Telephone Company, Bellevue, Ohio, Wm. C. Henry, President.

OUTSIDE PLANT ENGINEERS. Top pay plus per diem allowances. Good opportunity for right people. Reply Box 301 c/o TEM.

TRANSMISSION ENGINEERS—To work as transmission consultants. Write Box 211, c/o TE&M.

EQUIPMENT ENGINEERS for local and out of town assignments, with long and short terms available. Top pay. Reply with resume to box 306, c/o TEM.

ENGINEER: Electronic or communication engineering graduate with some experience in central office. Excellent opportunity for permanent job in growing company in ideal living area. The Columbia Telephone Company, Columbia, Pennsylvania.

Opportunity for recent Engineering graduate with interest in telephony and basic knowledge of electronics and switching. Limited experience useful but not mandatory. Present employes are aware of this Ad. Box No. 215 c/o TEM.

FOR RENT

COUNT PAY PHONE Collections in the coming busy Holiday Season with a modern Coin Counting machine. Rental charge is insignificant. Inquire Watkins Company, Box 146, Napoleon, Ohio.

HELP WANTED

AMBITIOUS MEN — Qualified as station installers, equipment installers, cable splicers, linemen Work in midwest. Harris McBurney Co., Inc., P. O. Box 267, Jackson, Michigan.

POSITION WANTED

PROBLEM SOLVER seeks challenge. Age 35, advanced degree, over 10 years top level legal commercial, employe relations, finance and plant experience. Heavyweight in agreements, analysis, administration and rate regulation. Reputation for putting out fires, cost reduction and fast action. Outstanding references. Ideal No. 2 man. Wants challenge with live company. Write Box 214, c/o TEM.

FOR SALE

USED COE: Sixty Line North Relay Automatic CX-100. Just removed from service. Complete and in excellent working order. Will make an excellent small exchange or PABX unit. Make us an offer Converter: Universal code to selective ringing converter. Like new. Write or call, West River Telephone Corporation, Hazen, North Dakota.

1 Year - 24 Big Issues - $4.00

FOR SALE—Immediate Delivery

6 Positions — 12-1600 Kellogg Manual Switchboard — 15 Cord Ckts. per position full Universal. 1100 Lines Equipped — Lamps and Jacks, 4 Pty. Keys, 20, Lamp Ending RD — Toll Trks. — Line and Cut Off Relays, Cook MDF and Associated Equipment Positions 1-2 and 3 together with Cable Turning Section, 4-5-6 Single Positions. Equipment has been highly maintained.

1-30 Line Kellogg Relaymatic Dial Board — 6-Links, Code Ringing —— 3-Composite Trks., Batteries and etc.

1200 — #1000 Type Kellogg Manual Telephones as removed from service.

Nocona Telephone Company

P. O. Box 120 — Nocona, Tex.
D. G. Gardner, Jr. — Tel. 825-3231

FOR SALE: Magnet Independent Telephone Co. at Magnet, Nebraska, consisting of 8½ miles of line in the country. Town lines are in cable and drop. About 50 phones of which ¾ are 901 Leich manuals. Together with modern house, lot, and other telephone properties. Gross revenue about $350.00 per month. Good reason for selling. Contact: Frank L. Termuhlen, Mgr., Box No. 56, Magnet, Nebraska.

WANTED TO BUY

TELEPHONES — Any condition. Desk stands, wall sets, etc. Advise quantity available. Write Box 78, c/o TE&M.

HEADSETS

(LIGHT WEIGHT OPERATORS TYPE)

#52-AW Operators Headsets with #396-A Plugs (new)

#52-AW-310 Operators Headsets with #310 Plugs (new)

#52-BW Operators Headset with 10 foot Coiled Cord and #289-B Plug (new)

JACK PANELS

PATCHING AND TOLL TEST

W. E. #230-A Jack Mountings complete with 26 #410-A Double Jacks, Mtg. Dimensions 17-5/16" length and 1-22/43" width for 19" Rack. (NEW MTGS, RECOND. JACKS)

W. E. #185 (PJ-341) Jack Mountings complete with 24 #410-A Jacks, Mtg. dimensions 17-5/16" length and 2-1/8" width for 19" Rack. (NEW MTGS. RECOND. JACKS.)

W.E. #218-A and #239-A Individual Jacks for above Mountings.

WE PROMISE YOU COMPLETE SATISFACTION!

BUCKEYE TELEPHONE & SUPPLY CO.

1250 KINNEAR RD. COLUMBUS 21, OHIO
488-0655(Area Code 614)

MID-WINTER SALE

Of manual central office equipment.
Adding a position, lines, or trunks to existing board.

NEW-GOOD USED-OR RECONDITIONED AT VIRTUALLY YOUR OWN PRICE

- Line and cut-off relays
- Repeating coils — condensers
- Jack and Lamp strips
- Keys. Drops

POWER EQUIPMENT MDF - PROTECTORS ALL NEW

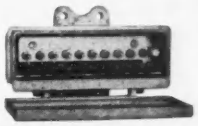
Cook #100 20 pr.	$10.00
A.E. #675 21 pr.	10.00
W. E. #1268B 23 pr.	10.00

Equipped with wall flanges for mounting

W. E. #1269A 20 pr.	10.00
W. E. #1435 20 pr.	10.00

(JANUARY BILLING IF YOU LIKE)

OPEN WIRE PROTECTOR



WE #83 A (#84A mtg. in galvanized iron box with hinge cover. Complete with #26 and #30 discharge blocks) New $2.50 ea. In lots of less than 12 $3.00 ea.

V. F. Repeaters Truck or Subscriber Lines Dial or Manual

12 to 18 DB gain (or 4 wire or both) building-out network & protection built-in, weather-proof wood case removable for 19" rack mtg. Brand new . . . $99.50

Good used 75.00

Fully Guaranteed
Shipped on Approval

NOTE: Test sets described here are quality equipment designed by the U.S.A. Signal Corps, assisted by the best men in the industry. This is just released post-war material manufactured in 1952 or later. Each set is tested before shipment.

the Telectric Company

1218 Venice Blvd., Los Angeles, Calif.
Richmond 8-2249 (DDD 213)

PRODUCTS & SERVICES

BELTS — CLIMBERS — Complete Lineman's equipment. W. M. Bashlin Co., Bashlin Bldg., Grove City 1, Pa.

BORING MACHINES, EARTH — Highway Trailer Co., Edgerton, Wisc.

CORDS, Switchboard (with or without plugs), Instrument (straight and retractile) cords in eleven colors. — Commercial Cord Co., Inc., 26 Main St., Clifton, Springs, New York.

POLES, Southern Yellow Pine — Taylor Colquitt Company, 217 Main St., Spartanburg, S. C.

POLES, Southern Yellow Pine — Texas Creosoting Co., Orange, Texas.

POLES, Southern Yellow Pine, Pressure Creosote and Creo-Penta — Piedmont Wood Preserving Co., P. O. Box 700 Augusta, Georgia, Spartanburg, S. C.

PROTECTIVE EQUIPMENT — Reliable Electric Company, 11833 Addison St., Franklin Park, Ill.

NORTHERN WHITE
CEDAR POLES
FULL LENGTH PENTA TREATED
PAGE & HILL, INC.
Plymouth Bldg., Minneapolis 3, Minn.

PRODUCTS & SERVICES

POLES • CROSSARMS
RAIL or TRUCK DELIVERY

Pressure-treated to your specifications. 16 sales offices, 34 plants serving you. See Yellow Pages, write or call Pittsburgh EXpress 1-3300.

C-10

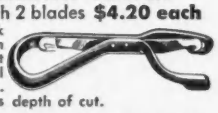
KOPPERS COMPANY, INC.
Wood Preserving Division
777 Koppers Bldg., Pittsburgh 19, Pa.

Cable Sheath Stripper
N-2878 – with 3 blades **$7.80 each**

Slits plastic or fabric covered cable. Rigid Phenolic Handle. Stainless steel saddle holds guide and blade in place. Groove guides and supports cable.

CABLE SHEATH SLITTER
N-62267 – With 2 blades **$4.20 each**

Tough, sharp hook blade digs in through most heavy-duty and all sizes of cables. Guide controls depth of cut.



RING CUTTING CABLE TOOL
N-2060 – With blade **$7.40 each**

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NEWS AND VIEWS OF INDEPENDENT TELEPHONY

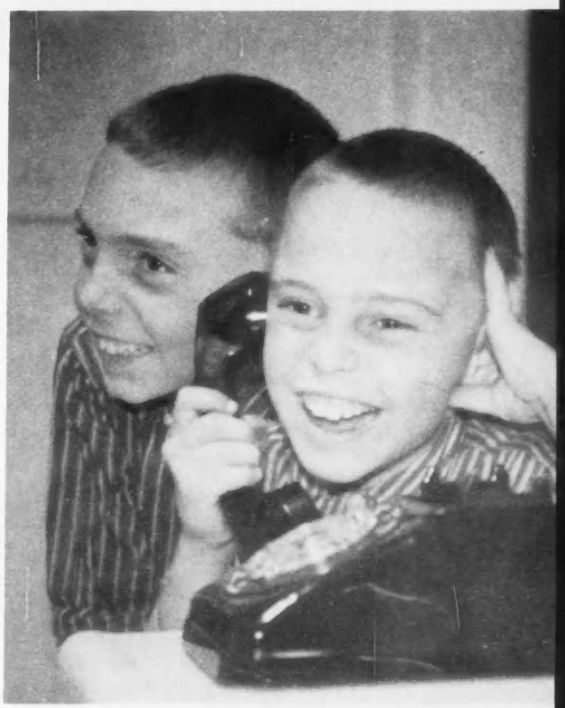
VOLUME 10, NO. 9 | Published by General Dynamics | Telecommunication | DECEMBER, 1961

Christmas . . . and we can phone you

One of the "unalienable rights" of Americans is freedom to choose where they will live. In exercising this choice, they customarily expect that benefits associated with our manner of living will be available wherever they are. When it comes to telephones — a benefit usually taken for granted — the operating company may have to approach this not as the usual business proposition, but as a matter of service for the public interest. Especially is this true in the "islands of isolation" still found in many parts of our country.

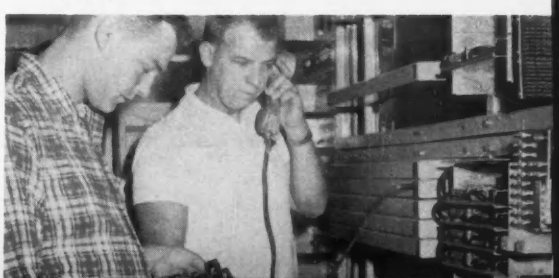
An example is one section of Arkansas, where the Four States Telephone Company (a subsidiary of Southwestern States Telephone Company organized with this purpose in mind) is serving areas where present income is low in relation to costs, but whose very isolation makes the service all the more appreciated. Three recently activated XY® Dial offices, in Jesup, Delaplaine and Hickory Plains, make it possible for many, for the very first time, to enjoy telephone service equal to the best.

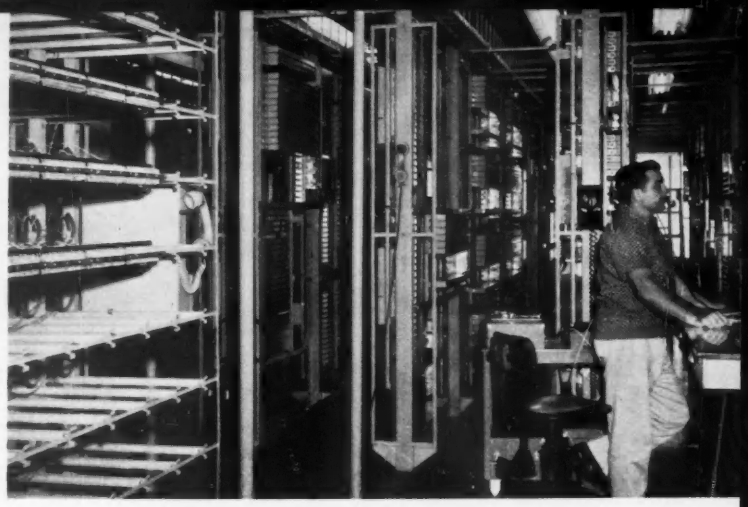
Each year at Christmas time, your editors select some story that shows a contribution to the happier, fuller life, in keeping with the Season. Surrounded as we are by new developments that promote progress, nothing is more in keeping with industry tradition than extending the usefulness, the comfort and the joy of telephone service to those who never had it before.



There's a new thrill to "Merry Christmas" as phone service begins for homes in this section of northeast Arkansas.

Making sure all is in readiness, Stromberg-Carlson installers test lines in one of three new Four States offices.





This 1285-line XY Dial office at Monticello was cut into service in 1959. The recent addition of XY Toll Ticketing and P.P.C.S. equipment assures United of Indiana subscribers the most modern and complete service.

Monticello, Ind., and Holbrook, Ariz., ready to enjoy

Twelve thousand subscribers in Indiana and Arizona have recently been added to the growing number who are enjoying the benefits of XY Toll Ticketing. Cutovers at Monticello, Indiana, by the United Telephone Company of Indiana and at Holbrook, Arizona, by the Western States Telephone Company provided this modern service.

Both Monticello and Holbrook serve as readout centers and each has five tributary offices. In addition to the XY Toll Ticketing, Stromberg-Carlson P.P.C.S. (Person-to-Person. Collect and Special) equipment will serve Monticello.

The advantages of mechanized operation were quickly realized by United of Indiana when the annual Farm Progress Show was held at Rensselaer, one of the tribs. Approximately 250,000 people swarmed into the Rensselaer area, producing more than 2,000 additional toll calls.

Without the XY Toll Ticketing in and working, the operator toll board would have been swamped. Use of the combined toll ticketing and P.P.C.S. facilities made possible the smooth handling of this enormous traffic load.

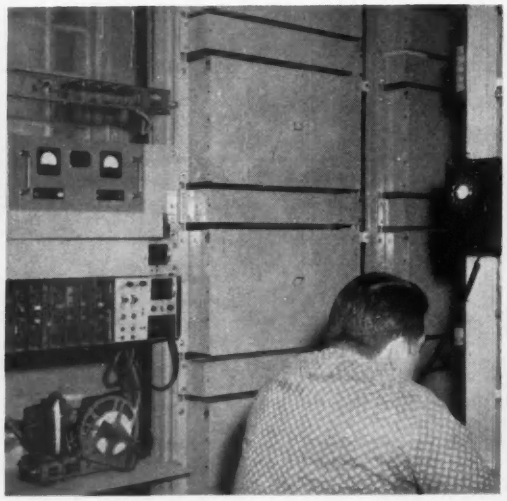
Jack Cluen, general traffic manager for United of Indiana, had a right to be pleased with the efficient service furnished to Farm Progress Show visitors. It was the result of weeks of coordination and cooperation between Show officials and operating company personnel.

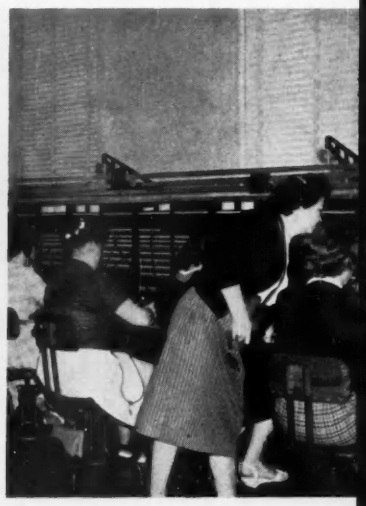
In Arizona some 3,700 subscribers are served by the Holbrook office and its tributaries. Holbrook is the second largest Independent office in the state.

The six offices in the Holbrook network are served by XY Dial as well as by XY Toll Ticketing. They will be operated with all-number calling.

To acquaint subscribers with this type of calling and with the new Direct Distance Dialing system, a subscriber education program was conducted by the company. Dial assist-

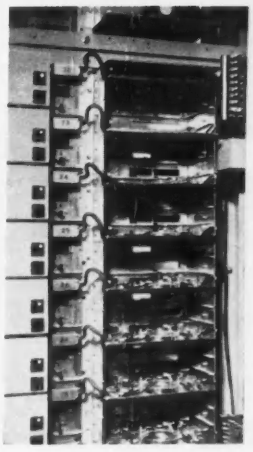
"Some day, maybe, we'll be doing that." Two "junior" operators accompany Beulah Jordan for a look at the Holbrook toll board. Operators are Bernice Pfanicuch, Jodi Perkins, Emmy Tanner, Beth Walden and Ola Smithson . . . High-speed intermediate readout equipment and tape punch are integral parts of efficient XY Toll Ticketing operation at Monticello . . . Stromberg-Carlson Number 3 Toll switchboard provides complete subscriber assistance at Monticello. Subscriber acceptance of the system has been extremely high.





Information from intermediate punch tape is converted and placed on cards at Warsaw, Ind. Mechanism of the billing process is just one of the many operating economies provided by XY Toll Ticketing.

STROMBERG-CARLSON TRANSMITTER XY



Bank of XY Tape Recorders in operation. Provision is made for recording incomplete calls, for assistance in traffic studies.

first full year of XY Toll Ticketing service

ance operators were on hand to help subscribers make their first calls over the new system.

Prior to the cutover, company representatives made personal visits to each prospective DDD subscriber, checking the subscribers' connection with the recording equipment and distributing DDD instruction pamphlets.

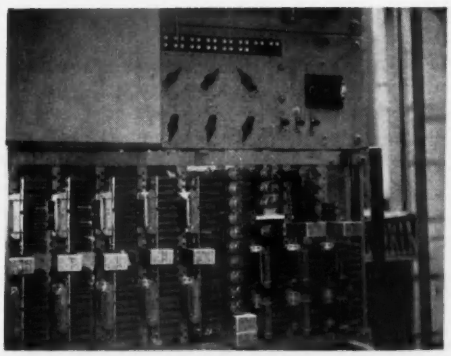
Results of the program were excellent. On the initial day of DDD service, 554 calls were completed, including 79 out-of-state calls.

President Al Jennings and vice president Ed Jennings were hosts at an Open House which marked the beginning of the new service.

One success deserves another. Completely successful inauguration of XY Toll Ticketing service was followed by outstanding attendance at Open House at Holbrook. E. J. Jennings, left, vice president and general manager of Western States Tel discusses Open House program with (left to right) D. A. McLean, assistant vice president, Mountain States Tel; Al Jennings, president, Western States Tel; A. G. Bessinger, American Tel & Tel; Marshall Wilson, Mountain States Tel.

Eighty-foot tower at Woodruff Butte repeater station serves Holbrook network.

Holbrook route interpreter determines proper method of directing each call from information dialed by subscriber.



Right — Open House guests at Holbrook learn about test board from Western States installer-repairman, L. A. Pitcher.

Portion of the centralized revenue-accounting department for all operating exchanges of United Tel of the Carolinas.

New headquarters for United of Carolinas

A recent Open House introduced the local citizens as well as many outside guests from the telephone industry to the new headquarters building of the United Telephone Company of the Carolinas, Inc., at Southern Pines, North Carolina. This operating company is a wholly owned subsidiary of United Utilities Incorporated.

The new building provides, for the first time, adequate offices and working areas for the executive functions of the company, as well as a centralization of such operations as accounting, plant and equipment engineering, and the commercial department.

In planning for utmost efficiency in operation, a great deal of thought was given to the communication system serving the headquarters. Mr. Ed Smail, president; Bob Bishop, commercial manager; John Bigbee, engineer; and George Thompson, plant superintendent — all had a part in determining the requirements and application of the revolutionary new Stromberg-Carlson electronic PBX system which was selected for internal-external communication. This provides features long desired but never before considered practical.

Ed Smail, president of United Telephone Company of the Carolinas, Inc., (left), takes Open House visitors through the lobby where the Stromberg-Carlson electronic PBX cabinet is placed in full view. Telephone industry visitors have come from many parts of the country to see this first installation.

United Tel employee is part-time attendant at PBX turret, part-time cashier-receptionist. Equipment cabinet at rear.

Keen visitor appraises products, processes

Jen Kuen Chen, a recent visitor to General Dynamics | Telecommunication, discusses manufacturing techniques with George French, left, production engineer, and C. H. C. Bon, right, export manager.

Jen Kuen Chen, chief of the TA-AN Repair Shop of the Taiwan (Formosa) Telecommunications Administration, was a recent visitor at the General Dynamics | Telecommunication plant in Rochester, N.Y. His four-day educational tour was sponsored by the International Cooperation Administration and arranged through the Federal Communications Commission.

Mr. Chen supervises renovation of all systems equipment in use in his native land, and directs the manufacture of such telecommunication products as are within their capabilities. He was particularly interested in the various stages of XY Dial manufacture and commented favorably on the completeness of Stromberg-Carlson test apparatus used within the factory and also the various test sets available for field use.

Mr. Chen noted the lead that General Dynamics | Telecommunication has taken in the electronic switching field. He also expressed interest in Stromberg-Carlson carrier developments, stating that carrier has a major application in Formosa.

After treatment in finishing tanks, steel uprights are painted for further protection against corrosion. Spray booths carry excess paint below floor level, play major role in keeping the finishing process an extremely clean operation.

Finishing department expansion marks increased product demand

As the demand for Stromberg-Carlson products continues to grow, individual departments within the manufacturing plant must also expand. The organic finishing department, an important contributor to the long life of Stromberg-Carlson equipment, has moved into larger, more efficient quarters.

The expanded facilities permit the zinc phosphate coating of larger items such as cabinets, further increasing corrosion protection. This protective coating also improves paint adhesion.

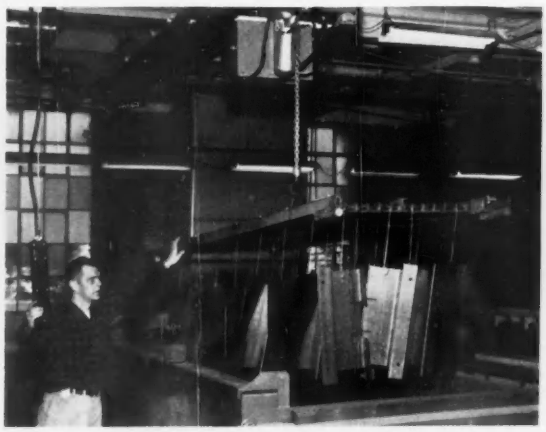
Additional equipment permits the electrolytic cleaning of steel. This process removes foreign matter more efficiently, providing a smoother finish on steel surfaces.

New semi-automatic devices, including two overhead monorail conveyer systems, will help the department meet increased production schedules. Each monorail can carry up to 48 pieces of material to the pre-paint treatment tanks.

Two more water-wash spray booths, where the equipment is spray painted, will also speed production. These booths eliminate atmospheric contamination by sucking the excess spray into miniature waterfalls where it is carried to sub-level vats and then skimmed off the water.

The quality of production, always the foremost consideration in Stromberg-Carlson products, receives an additional boost from the cleanliness of the operation. The department has no overhead ductwork, all fluids and fumes being carried away below floor level. Improved ventilation has practically eliminated the need for reworking of materials.

Inspection of the finished product has also been improved with the addition of special lighting which simulates north-daylight, allowing a closer check on color work.



Cabinet braces begin their tour of treatment tanks. New semi-automatic devices have helped organic finishing department meet increased production schedules while maintaining the expected high quality of product. After completing treatment process, the braces will be rinsed several times in preparation for painting.

New circuit plate tester boosts reliability

Reliability of XY circuit plates, already surpassing existing industry standards, was given another boost recently with the addition of a new selector test fixture at the Rochester, N. Y., plant.

The new fixture employs push-button dialing for faster and more effective testing of selector plates. A total of 20 to 40 digits are dialed into each selector during testing; with push-button dialing the time required and chance for error are reduced.

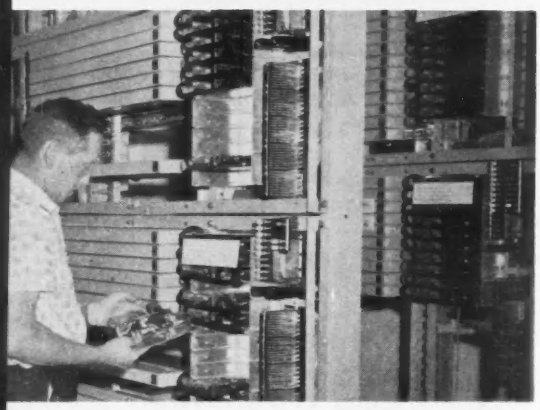
The fixture is also equipped with five automatic switching circuits which are preprogrammed to test various types of selector plates. This feature eliminates the setup time required in testing commonly used circuit plates.

A transfer circuit is provided which automatically changes all testing circuits from terminals on circuit plates under test to special outlets. This makes the test equipment more versatile and more adaptable to testing any type of XY selector circuit plate.

More than 10,000 varieties of Stromberg-Carlson circuit plates are manufactured at the Rochester plant at an average of 450 different types of plates each week.

Stephen Stott, left, designer, James McBride, builder, right, watch as Sam Personte of circuit plate inspection tries new test fixture.

Special training table was used to help operators learn key pulsing techniques. Winnie B. Burnett, left, traveling chief operator for Southwestern States Telephone Co., directs the training of Margaret Benoit and Pat Nugent. Welsh was the first toll center of the company to use key pulsing.



R. B. Rinehart, central office repairman for the Southwestern States Telephone Co., tours 290-line XY Dial office at Oberlin, which is part of the toll network. Mr. Rinehart, who works out of Lindsay, Okla., was brought in to assist with preparations for toll center operation at Welsh.

Operators continued their training on the Stromberg-Carlson switchboard prior to cutover. Seven of the 14 positions in service at Welsh are shown. From the left are Vergie Sonnier, clerk-service assistant; Era Lowry, Brownwood chief operator; Jean Lyons, Esther Royer, Pris Aguillard, Shirley Hebert, Ethel Bertrand, Margaret Myers, and Gale Duhon.

This Stromberg-Carlson equipment was installed at Welsh to provide intertoll and toll center facilities. Here installation foreman Jim Cancne looks over the layout. The Welsh office has been served by XY Dial equipment since 1953. Originally installed as a 400-line office, it has grown by 60%.

Southwestern States makes Welsh, La., full toll center

The Welsh, La., office of the Southwestern States Telephone Company has been made a full toll center, serving twelve of the company's Louisiana offices. Southwestern States Tel has headquarters in Brownwood, Tex., and operates offices in Arkansas, Louisiana, Oklahoma and Texas.

Both the traffic department and the terminal room of the Welsh office were enlarged and remodeled to provide space for equipment necessary for toll center conversion. Eight positions of Stromberg-Carlson toll board have been added to the six positions already at Welsh. A new four-position information switchboard has also been installed.

A carrier-microwave system has been set up to link the eleven other offices with the Welsh toll center. Oberlin, La., controlled by the Southwestern States' subsidiary, the Four States Telephone Company, recently converted to XY Dial and is part of the toll network.

Welsh was the first toll center of Southwestern States Tel to be equipped with key pulsing equipment. An intensive training program using a specially designed table was conducted to assist the operators, including several new ones, in learning key pulsing techniques in toll center operation.

The training program was directed by Winnie B. Burnett, traveling chief operator for the company. She was assisted by Era Lowry, chief operator at Brownwood, and Emma Joy Demoruelle, Welsh chief operator.

The twelve offices which make up the toll network will be operated on an all-number-calling basis. They serve a total of 4,700 subscribers in southwest Louisiana.

Transmitter
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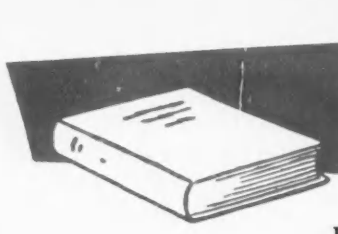

THE BACK OF THE BOOK

By JOHN G. REYNOLDS

"Don't Buy Wallpaper"

ARE YOU an investor who was unlucky enough to have accumulated a pile of worthless old securities? If so, go ahead and paper a room with them and don't feel too badly.

That advice is given in an article in *The Exchange Magazine*, the New York Stock Exchange publication. And, it points out, if you do own securities of this nature you're in distinguished company. The estates of some of the country's richest and most famous men, including J. P. Morgan and Franklin D. Roosevelt, have contained worthless stocks and bonds. When it comes to choosing securities, nobody is infallible.

At the same time, there's a chance, though a long one, that supposedly worthless securities may be just the opposite. The article tells of a doctor who bought a batch of bonds for $34 to paper his den. Three years later an officer of the liquidating trust company handling the "dead" issue turned up in the doctor's place, detected signs of life in the fancy wallpaper and paid $15,000 for the privilege of applying a "void" stamp to the certificates.

Actually, as the article also observes, most presently worthless bond and stock certificates were valueless in the first place, and never could have stood up under the examination that securities now listed on registered stock exchanges must face. The investor has far greater protection from misrepresentation than ever before when he buys listed securities.

The Way to Oblivion

A MAN from Mars listening in on world arguments as to freedom and peaceful co-existence would be completely confused. Half the people of the world don't know the meaning of freedom. The other half have become so used to having it, without any effort or sacrifice on their part, that they accept political trends that would destroy it, without thinking.

Centralized authority that emerges from the welfare state, and government in business in competition with its own citizens, evolves eventually into socialism and communism. In the name of freedom and liberation of a people, government then tells the individual what to do, and shoots him if he resists.

When people become mere servants of public officials rather than their masters, freedom no longer exists. A government that guarantees freedom is one that protects individual opportunity and ownership of property, not one that restricts and destroys life, liberty and the pursuit of happiness.

When people forget this they are on their way to oblivion.

Call for Help

NORWAY'S state-owned telephone system is in trouble. In the capital city of Oslo alone there is a shortage of 50,000 telephones. Elsewhere facilities serving that country's 738,000 telephone subscribers are overburdened.

A survey group has described the situation as "desperate." And from that group comes as nice a compliment to private enterprise as has been heard for a long time. The Norwegian study group recommends that a privately-owned U. S. telephone company be invited to come in and straighten out the state-owned system. (*Or in case of emergency, dial PRivate ENterprise, as every bright little Socialist seems to learn.*)

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A Christmas Thought

This is the season for wishful waiting . . . for sky gazing in anticipation. For the "Satellite" that streaks our skies at Christmas is one of love and wonder and warmth. It is *Saint* Nick not Sputnik, sped on his way by the spirit of giving not grasping; of hope not hate. In this spirit, the men and women of USI extend to you their wish for a very happy holiday and a most rewarding year ahead. Merry Christmas!

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Bill Goodwin...

Bill Goodwin is one of our "Revenue Men" in St. Joseph, Missouri.

Just recently, he celebrated his tenth anniversary with General Telephone Directory Company. He joined us in 1951 as a sales representative in our Erie, Pennsylvania unit, and became St. Joseph Sales Supervisor in 1957.

Bill is a man who likes action. In high school, he was a star member of the basketball and football teams, and played in the band . . . drums, of course. In 1940, months before the war began, he joined the U. S. Army. Platoon Sergeant Goodwin's overseas action included the invasion of Sicily and Italy.

Naturally, you'd expect Bill to be a live wire in community affairs. He's a member of the Elks, VFW and holds a Recognition Award from the American Legion for his services as a Post Commander. His family claims the rest of his time.

Bill is typical of the "Revenue Men" who work for General Telephone Directory Company . . . and for you. They're an asset to any community.

Are you keeping pace with the trend of increased directory revenue? The potential is enormous. You can't afford *not* to keep pace.

The revenue you earn from a well-sold, well-published directory can give you the highest net profit of any service you sell. Little or no expense is charged against it. And directory profits can make a hefty contribution to total net earnings.

Our "Revenue Men" are trained to help you exploit the rich potential of directory revenue. Backed by our Complete Directory Service Plan, they work with market-tested procedures to tap every source of revenue: local, regional and national.

May we show you a plan tailored to fit your needs? No obligation, of course. Just call or write.

GENERAL TELEPHONE DIRECTORY COMPANY

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